



BLUEPRINT FOR BUILDING THE ENERGY ECONOMY IN MARYLAND:

Green Bank Preliminary Findings Report

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EXECUTIVE SUMMARY

During the 2014 legislative session, the Maryland General Assembly passed Senate Bill 985 (Chapter 365 of the 2014 Laws of Maryland) entitled “Maryland Clean Energy Center—Green Banks & Clean Bank Financing Study,” which directed MCEC to study the feasibility of developing a green bank for the State of Maryland. This study focuses primarily on the role of green banks in financing renewable energy and energy efficiency and on the potential need for a green bank in Maryland.

What is a green bank?

A green bank is a financial organization that uses strategic public-private partnerships to overcome market barriers and increase the amount of private capital available to finance clean energy projects.

There are four existing models for a green bank: a quasi-public organization, a state clean energy financing authority, an infrastructure bank, and an independent nonprofit (such as a community development financial institution (CDFI)).

The key benefits of a green bank include: 1) leveraging of public funds with private capital; 2) private-sector capacity building; 3) access to unique public and private-sector financial tools; and 4) centralization and coordination of finance programs within a state.

How have other states implemented green banks?

Four states have established green banks, three of which are now leveraging millions of dollars in private-sector investment to meet public-sector energy and environmental goals. Other states are working toward building similar mechanisms or already have entities that provide green bank functions.

Three of the four existing green banks have been capitalized with a combination of a system benefit charge and Regional Greenhouse Gas Initiative (RGGI) proceeds, but other funding sources are also possible.

Of the four existing green banks, two are state agencies, one is a quasi-public agency like MCEC, and one is a state infrastructure bank.

These organizations serve as models for how a green bank can be developed successfully in Maryland.

What green financing programs currently exist in Maryland?

Maryland currently has numerous public-sector managed financing programs targeting multiple sectors. These programs are operated by a variety of different entities in a decentralized manner.

At an average of \$20 million in lending per year, the amount of financing available through these programs alone is insufficient to meet the State’s multi-billion dollar energy efficiency and renewable energy financing needs. Private-sector capital will need to be leveraged to meet this need.



MCEC plays an important role in connecting related resources to needs and is established as a trusted third-party advisor for consumers looking to deploy solutions or find financial assistance. MCEC's Maryland Clean Energy Capital (MCAP) and Maryland Home Energy Loan (MHELP) programs have been effective at leveraging private-sector capital.

Private-sector financing options are readily available in some sectors and for certain technologies, but private-sector financing gaps still exist in many areas.

What green financing gaps and needs exist in Maryland?

Maryland has significant untapped renewable energy and energy efficiency potential, including an estimated \$5.7 billion in renewable energy investment related to the State's Renewable Portfolio Standard and an additional \$2.6 billion in cost-effective efficiency savings.

Stakeholders participating in the study, including financial institutions, contractors, utilities, municipalities, consumer advocacy groups, and entrepreneurs identified both financing and non-financing gaps in Maryland.

The financing gaps include the availability of capital for small commercial / small business projects between \$5,000 and \$2 million, low- to moderate-income residential projects, small municipal projects between \$50,000 and \$1 million, and emerging technologies in all sectors.

The non-financial gaps include the need for education and awareness, capacity building, technical assistance, coordination, and standardization.

Conclusions

Maryland will need to leverage private-sector capital in order to meet its more than \$8 billion energy efficiency and renewable energy need. Many of the Maryland stakeholders that are facing financing gaps, like small businesses and low-to moderate-income residents are also those with the most need. A green bank could centralize and coordinate Maryland's many existing finance programs, fill the associated technical assistance gaps, leverage private-sector capital to address the State's outstanding clean energy needs, and create jobs. Green banks in other states, like New York and Connecticut, provide models of how this can be done successfully.

The report's findings suggest a green bank could address Maryland's clean energy financing and non-financing gaps.

1. Introduction

Since its creation in 2008, the Maryland Clean Energy Center (MCEC) has promoted the State's clean energy industry in a variety of ways, through finance program administration, economic development, clean energy technology deployment, incubation support, and industry data tracking and information dissemination. MCEC also offers outreach and technical support to Maryland's clean energy industry.

During the 2014 legislative session, the Maryland General Assembly passed Senate Bill 985 (Chapter 365 of the 2014 Laws of Maryland) entitled, "Maryland Clean Energy Center—Green Banks & Clean Bank Financing Study," which directed MCEC to study the feasibility of developing a green bank for the State of Maryland. MCEC engaged Cadmus and its partners, the National Association of State Energy Officials (NASEO), Catalyst Financial Group, and the Center for Climate and Energy Solutions, (the Cadmus team) to conduct a preliminary study and produce the corresponding report by December 1, 2014, as SB 985 directs.

The study is timely; Maryland is facing a renewable energy and energy efficiency investment need of more than \$8 billion between now and 2025, including an estimated \$5.7 billion in renewable energy investment related to the State's Renewable Portfolio Standard¹ and an additional \$2.6 billion in additional energy efficiency savings opportunities². In response to similar needs, New York's Green Bank, which began early this year, recently announced its first set of seven transactions totaling over \$800 million. To date, four states have established green banks, and ten other states, including Maryland, have begun to study whether or not to establish a green bank.

SB 985 laid out MCEC's and the Maryland Energy Administration (MEA)'s goals for this study, including the following³:

- Review the structure and organization of green banks and clean energy financing initiatives established in other states;
- Examine the method of capitalization of established green banks and clean energy financing initiatives;
- Examine the sources, type, and amount of private capital leveraged or invested in connection with the establishment of a green bank or clean energy financing initiative;

¹ "Refined Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan—Appendices C through E." (2013). Page 27. Regional Economic Studies Institute, Towson University. Accessed November 26, 2014: http://climatechange.maryland.gov/site/assets/files/1392/appendix_e-2_-_economic_impact_analysis_c_through_e_final.pdf

² "Energy efficiency: The first fuel for a clean energy future; resources for meeting Maryland's electricity needs." (2008). American Council for an Energy-Efficient Economy. Accessed November 7, 2014: <http://www.aceee.org/research-report/e082>

³ Maryland SB 985, July 2014



- Review the financial services provided by existing green banks and clean energy financing initiatives;
- Review the need to provide low-cost financing to clean energy and energy efficiency projects, the need to warehouse and securitize clean energy and renewable energy and energy efficiency financial instruments, and any other gaps in the availability of financing for clean energy and energy efficiency projects in the State;
- Review the impact of existing Maryland financial programs on the renewable and energy conservation industries; and
- Consider any other relevant information that the Center or Administration determines appropriate.

On behalf of MCEC, the Cadmus team undertook three tasks to address these goals:

- An overview of existing green banks and clean energy financing entities across the United States, identifying models that might be appropriate for Maryland (Chapters 2 and 3).
- A review of existing clean energy finance offerings in Maryland in order to determine where gaps might exist (Chapter 4).
- A targeted survey and a series of discussion groups with key constituencies that would be important green bank stakeholders in order to identify additional financing needs (Chapter 5).

The statute directs MCEC to provide the Senate Finance and House Economic Matters Committees with a draft report addressing these goals on or before December 1, 2014. This report fulfills that requirement.

2. Green Bank Overview

Section Summary

- A green bank is a financial organization that uses strategic public-private partnerships to overcome market barriers and increase the amount of private capital available to finance clean energy projects.
- There are four existing models for a green bank: a quasi-public organization, a state clean energy financing authority, an infrastructure bank, and an independent nonprofit (such as a community development financial institution (CDFI)).
- The benefits of a green bank include leveraging of public funds with private capital, private-sector capacity building, access to public and private-sector financial tools, and centralization and coordination of finance programs within a state.

History and Definition

The first clean energy finance programs were established in the 1970s and 1980s in states as diverse as Nebraska, New York, and Oregon. These early programs typically offered some form of direct incentive, such as a rebate or low-interest direct loan in order to improve project economics and incentivize technology adoption. Over time, the gradual expansion of state clean energy finance programs, the accumulated experience administering these programs, and the needs of clean energy markets have required programs to adopt more sophisticated tools. Rebates and revolving loan funds have been superseded by more advanced forms of credit enhancement and public-private partnership. As a result of this increasing sophistication, many states across the country—in partnership with private financial institutions and lenders, localities and municipalities, and other state and local partners—have reached critical momentum in their financing programs and are seeking channels to consolidate, streamline, and scale their offerings.

The emergence of the “green bank”—also known as a clean energy bank, energy investment partnership, or energy infrastructure bank—is a response to this need to ramp up access to capital for clean energy projects. A green bank is a financial organization that uses strategic public-private partnerships to overcome market barriers and increase the amount of private capital available to finance clean energy projects. The concept involves a carefully structured, collaborative, and flexible organization with the ability to leverage scarce public funds with private capital. Green banks aim to achieve public sector energy, environmental, and job creation goals associated with clean energy deployment while simultaneously transitioning away from government-funded grants, rebates, and other directly-subsidized programs.

A green bank is a financial organization that uses strategic public-private partnerships to overcome market barriers and increase the amount of private capital available to finance clean energy projects.



Currently, four states have established a formal green bank.⁴ Ten additional states, including Maryland, are in various phases of green bank exploration or development,⁵ and many states have operational financing entities whose roles are similar to that of a green bank. Though most of the green banks and similar finance programs currently in existence have been chartered by a state or local government, the paths of their establishment also reveal a high level of involvement from diverse industry, government, and nonprofit stakeholders. The structure and operation of each green bank is a function of the following:

- A state's specific goals and energy policy objectives
- Its energy market, including the supply of and demand for energy efficiency and renewable energy projects and financing
- The existence of authorities or agencies that already offer financing for clean energy projects
- The level of industry and political support for the program

A review of existing green banks reveals a set of common characteristics. Generally, existing green banks share the following goals:

- Leveraging public funds with private capital.
- Creating self-sustaining programs with a near-term focus on building or replenishing capital and a long-term focus on transitioning the program's financing activities to the private sector.
- Increasing the availability of capital in both the short and long term.

The pressures of aging and inefficient infrastructure, fluctuating energy prices, reductions in federal incentives for energy-related projects, and difficult economic conditions have created a multibillion dollar need for energy improvements in the United States. This need for funding exceeds the level of capital made available via conventional public sector clean energy financing programs.^{6,7} Existing green banks in the United States have been established in order to address this need. For this reason, a key theme among green banks is leverage, which refers to a range of approaches that bring in private capital from markets and financial institutions in order to increase the impact of a fixed amount of public funds.

⁴ States with an established green bank include Connecticut, New York, New Jersey, and Hawaii.

⁵ States exploring or developing a green bank include California, Illinois, Kentucky, Maryland, Massachusetts, Minnesota, Nevada, Rhode Island, Vermont, and Washington.

⁶ "Unlocking energy efficiency in the US economy." (2009). McKinsey & Company. Accessed October 8, 2014: http://www.mckinsey.com/client_service/electric_power_and_natural_gas/latest_thinking/unlocking_energy_efficiency_in_the_us_economy

⁷ "Building a revitalized clean energy economy." (2009). Union of Concerned Scientists. Accessed October 8, 2014: http://www.ucsusa.org/sites/default/files/legacy/assets/documents/global_warming/Climate-2030-Blueprint_executive-summary.pdf

⁸ "State energy revolving loan funds – overview and trends." (2014). National Association of State Energy Officials. Accessed October 8, 2014: <https://www.naseo.org/state-energy-financing-programs>

Finally, green banks emphasize organizational sustainability and private-sector involvement as a means of delivering consistent market signals. Green banks aim to create sustainable revenue streams through interest repayment and/or fees for services. They also develop historical data about the performance of the technologies deployed through the green bank and the performance of the related financing. Green banks begin with the end in mind, developing an “exit strategy” that transitions the operation of the program from the public to the private sector.

Common Organizational Models and Implementation Methods

Organizational Models

While leverage, scale, and sustainability are the common objectives for green banks, existing green banks have employed a wide range of models and approaches to achieve those goals.

The green bank moniker originated with the Coalition for Green Capital, which describes three models that are available to states and localities interested in developing a green bank:⁹

- The **quasi-public organization model**, through which several existing funding sources are consolidated under one umbrella. The Connecticut Green Bank is an example of this model. MCEC is an example of this type of entity in Maryland.
- The **state clean energy financing authority** model, which remains housed within a state or local entity and partners with outside stakeholders to increase access to third-party capital. The New York Green Bank fits this model; it is housed within the New York State Energy Research and Development Authority (NYSERDA), a state agency. The Hawaii Green Energy Market Securitization (GEMS) program is a second example; it falls under the Hawaii State Energy Office.
- The **infrastructure bank** model, in which an infrastructure bank combines with a state energy authority to finance clean energy projects. New Jersey’s Energy Resilience Bank fits this model.

Our review of green banks and green banking initiatives suggests that there is a fourth potential model, **the nonprofit community development financial institution (CDFI) model**. Here, a freestanding entity may offer a robust suite of financial offerings in a self-sustaining, scalable fashion. The Florida Solar and Energy Loan Fund exemplifies this model.

Implementation Methods

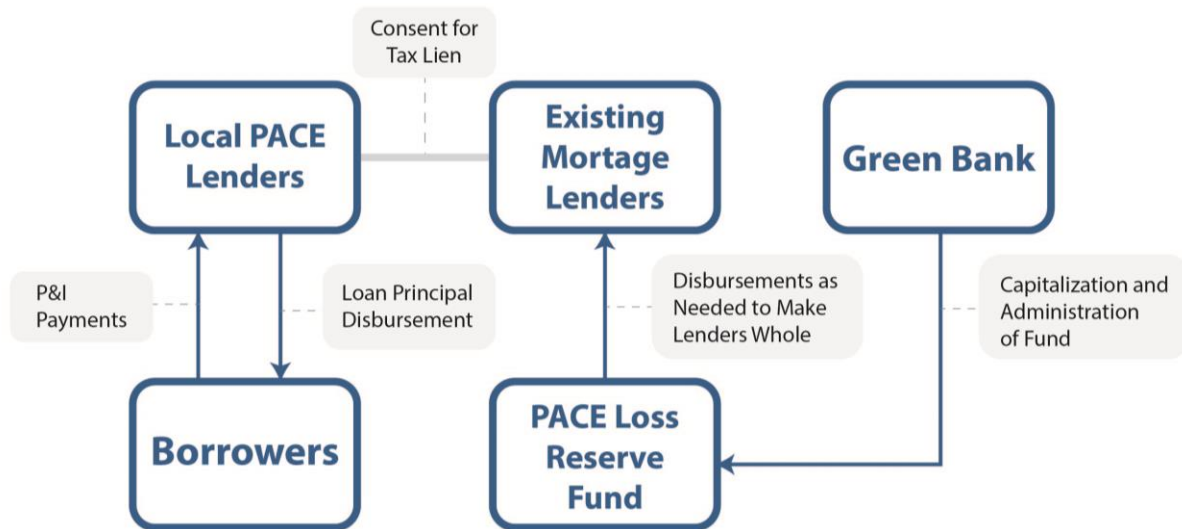
We can also discern commonalities in the suite of financial services that green banks offer. Not surprisingly, credit enhancements typically form an important part of green bank portfolios. Green banks offer credit enhancement to boost lenders’ and private investors’ confidence in investing their capital and/or expanding the pool of borrowers who are eligible to access financing. Green banks are

⁹ “State Clean Energy Finance Banks: New Investment Facilities for Clean Energy Deployment” (2012). The Brookings Institution. Accessed November 26, 2014: <http://www.brookings.edu/research/papers/2012/09/12-state-energy-investment-muro>



also heavily involved in other opportunities to leverage lending capital, including revolving loan funds; property assessed clean energy (PACE) programs, and sales of loans to the secondary market. Figure 1, below, shows an example of how a PACE loss reserve fund, like the one currently in operation in California, uses public-sector money to overcome a market barrier and increase the flow of private-sector capital to borrowers.

Figure 1: Diagram of a Green Bank PACE Loss Reserve Implementation



Benefits

Green banks offer a wide variety of benefits to the states in which they operate. One of the most obvious benefits is green banks' ability to leverage private-sector funds. By reducing the risk associated with lending for clean technologies that the private sector may consider to be untested, or for energy efficiency packages with which the private sector is not familiar, the green bank helps to overcome market weaknesses and build the private sector's confidence and capacity. Once the private sector becomes more comfortable with the types of loans for which the green bank offers an enhancement, the enhancement can be scaled back and eventually eliminated and the green bank can move its focus to another area.

In addition to addressing market weaknesses and building private-sector capacity, green banks also gather technology and financial performance data which help to build the private sector's confidence about investing in cutting-edge projects.

Because they are designed to serve a particular state, green banks can tailor their offerings to match the needs and priorities of that state and its consumers. They are able to develop community-based projects that are designed to suit the needs and conditions of local businesses and homeowners. Green banks can also provide education around green technologies, and can help increase marketplace awareness of their benefits.

3. Comparison of Existing Green Banks

Several organizations across the country—including some that do not use the designation “green bank”—have developed models, program designs, and visions that promote leverage, scale, and sustainability in the fashion described above. This section examines these green banks and similar entities across a set of key metrics and provides an overview of each organization’s history, structure, and programs. These organizations serve as models for how a similar green bank could be successfully deployed in Maryland.

Section Summary

- This report provides a snapshot of the four existing green banks (Connecticut, Hawaii, New Jersey, and New York) and three additional entities that offer green bank functions (California, Florida, and Oregon).
- Existing green banks can be compared across metrics such as organization and structure, financial services offered, method of capitalization, and types of private-sector capital leveraged.
- The majority of existing green banks have been capitalized with a system benefit charge (a surcharge on residential and commercial electric bills) and/or Regional Greenhouse Gas Initiative (RGGI) proceeds, but other funding sources are also possible.
- Of the four existing green banks, two are state agencies, one is a quasi-public agency like MCEC, and one is a state infrastructure bank.

Key Metrics for Comparison

In order to facilitate comparison, each green bank has been benchmarked across a series of key metrics. These metrics include structure/organization, financial services, method of capitalization, and leverage. These metrics offer insight into how various green banks have utilized different models and implementation methods to respond to state and local conditions and energy policy, planning, and economic development priorities.

Metric 1: Organization and Structure. A green bank or green banking initiative can be established, structured, and organized in various ways. Their charters may come from state or local legislation or executive action, or banks may develop as stand-alone organizations. A green bank may be fully housed within state or local government, act as a quasi-governmental agency that employs taxpayer and/or ratepayer dollars, or be a wholly independent organization.

Metric 2: Financial Services Offered. Green banks are involved in a wide range of financial services, which may include direct lending (with or without an on-utility-bill repayment option), credit enhancements (such as loan guarantees, loan loss reserves, subordinated debt, or insurance products), leasing products, securities transactions, warehousing, lines of credit, and tax-lien financing through PACE programs.



Metric 3: Method of

Capitalization. A primary draw for green banks is their ability to aggregate and deploy capital from various sources. A green bank can be capitalized, sustained, and expanded through a combination of state, federal, local, or philanthropic grants and funds; ratepayer or public benefit funds; bond issuances; secondary market transactions; fees for services provided; capital from financial institutions, financial investors, and foundations; tax levies; and sales of equity.

A green bank can be capitalized [...] through a combination of state, federal, local, or philanthropic grants and funds; ratepayer or public benefit funds; bond issuances; secondary market transactions; fees for services provided; capital from financial institutions, financial investors, and philanthropic program-related investments; tax levies; and sales of equity.

Metric 4: Private Capital Leveraged. Another metric by which to compare green banks is their ability to achieve leverage, which is the ratio of private-sector investment to public-sector investment. A credit enhancement such as a loan loss reserve, which encourages lenders to make loans by committing a relatively small amount of money to help cover the risk of default, is a common model for leveraging outside capital.

Green Bank Snapshots and Comparison

This section contains snapshots of the existing green banks in Connecticut, Hawaii, New Jersey, and New York. The subsequent section offers snapshots of entities that, while not called green banks, provide green bank functions in California, Florida, and Oregon.

Connecticut Green Bank

The Connecticut Green Bank, formerly the Clean Energy Finance and Investment Authority (CEFIA), is a quasi-public financing authority that supports financing for clean energy projects in Connecticut. It was created in 2011 by the Connecticut Legislature as part of Public Act 11-80: An Act Concerning the Establishment of the Department of Energy and Environmental Protection and Planning for Connecticut's Energy Future.¹⁰ CEFIA's predecessor organization was the Connecticut Clean Energy Fund (CCEF), which was created in 2000 by the Connecticut Legislature and funded more than \$150 million in renewable energy projects, emerging technology investments, and awareness programs statewide.¹¹

¹⁰ "Senate bill no. 1243. Public act no. 11-80. An act concerning the establishment of the Department of Energy and Environmental Protection and Planning for Connecticut's energy future." (2011). Connecticut Senate. Accessed November 6, 2014: <http://www.cga.ct.gov/2011/act/pa/2011PA-00080-R00SB-01243-PA.htm>

¹¹ "House bill no. 7432. Public act no. 07-242. An act concerning electricity and energy efficiency." (2007). Connecticut House of Representatives. Accessed Nov. 6, 2014: <http://www.cga.ct.gov/2007/act/pa/2007pa-00242-r00hb-07432-pa.htm>

The Connecticut Green Bank invests in an array of enterprises, initiatives, and projects aimed at attracting and deploying capital in support of the clean energy goals of Connecticut. It also develops and implements strategies that lower the cost of clean energy to make it more accessible and affordable to consumers, and works to reduce reliance on grants, rebates, and other subsidies to move toward innovative low-cost financing of clean energy deployment.

The Connecticut Green Bank's programs are funded from a variety of sources, including a system benefits charge, RGGI auction allowance proceeds, federal funds and grants, and private capital in the form of contracts executed with investors and other sources. The fund is overseen by the Connecticut Green Bank Board of Directors, which includes stakeholders and experts from both the public and private sectors.

The Connecticut Green Bank offers the following financial services:

- Connecticut Solar Lease Program,¹² which finances solar photovoltaic and solar hot water technologies for residential single family and commercial customers at an implied cost of capital below 10 percent and with lease terms as long as 20 years;
- Community investment micro-grants;
- Smart-E Loan Program,¹³ an energy efficiency, fuel conversion, and renewable energy residential loan program with interest rates ranging from 4.49 percent for five years to 6.99 percent for 12 years, for which the Green Bank offers a "second loss" reserve fund and an interest rate buy down;¹⁴ and
- Commercial Property Assessed Clean Energy (C-PACE) Program, which finances energy efficiency and renewable energy projects for commercial, industrial, and 5+ unit

The Connecticut Green Bank's programs are funded from a variety of sources, including a surcharge on residential and commercial electric bills, RGGI auction allowance proceeds, and federal grants. These funds are then used to leverage additional private-sector capital.

Connecticut Green Bank
Organizational Structure
Quasi-public agency established by the legislature in 2011
Method of Capitalization
<ul style="list-style-type: none"> • System benefit charge • RGGI proceeds • Grants • Private capital
Private-Sector Capital Leveraged
<ul style="list-style-type: none"> • Contracts executed with investors and other lenders
Financial Services Offered
<ul style="list-style-type: none"> • Third-party loans • Leases • PACE

¹² "Connecticut solar lease." Energize Connecticut. Accessed November 6, 2014: <http://energizect.com/residents/programs/ct-solar-lease>

¹³ "Smart-E loans." Energize Connecticut. Accessed November 6, 2014: <http://energizect.com/residents/programs/smart-e>

¹⁴ "Smart-E interest rate promotion." (2013). Ali Lieberman, Clean Energy Finance and Investment Authority. Accessed November 6, 2014: http://www.ctcleanenergy.com/Portals/0/board-materials/5_Promotional%20IRB_Smart-E%20Loan_Memo_043013.pdf



multifamily property owners for less than 6 percent interest for up to 20 years through a voluntary property tax assessment.¹⁵

The Connecticut Green Bank has seen positive program results and significant leverage. Its \$9.5 million investment in the CT Solar Lease program has attracted \$50 million in private capital from debt providers and a tax equity partner (a 5:1

The Connecticut Green Bank estimates that its investments have created nearly 1,200 jobs.

leverage ratio). The Smart-E Loan's \$2.5 million second loss reserve covers either 7.5 percent or 15 percent of the loan balance depending on FICO score and makes available \$28 million in financing (11:1 leverage). The C-PACE Program has approved over \$20 million in loans, introduced 16 capital providers into the program, and sold an initial portfolio of \$7 million in projects to Clean Fund, a C-PACE capital provider. The Connecticut Green Bank estimates that its investments have created nearly 1,200 jobs.¹⁶

Hawaii Green Energy Market Securitization¹⁷

In June 2013, the passage of Act 211 established the GEMS program,¹⁸ which will use an innovative combination of a loan fund, rate reduction bonds, and on-bill repayment options to finance efficiency and renewable energy improvements in underserved communities. GEMS targets renters, nonprofits, and homeowners who would not normally have access to conventional financing. As the implementer of GEMS, the State Energy Office oversaw the submission of the program's Financing Order and Program Order applications with the Public Utilities Commission (PUC), which the PUC approved in September 2014. GEMS is scheduled to become operational in December 2014 with a total capitalization of \$150 million.¹⁹

Hawaii GEMS
Organizational Structure
State agency working with PUC, established by the legislature in 2013
Method of Capitalization
<ul style="list-style-type: none">• System benefit charge backing revenue bonds
Private-Sector Capital Leveraged
<ul style="list-style-type: none">• Investors via bond issuances
Financial Services Offered
<ul style="list-style-type: none">• On-bill repayment for solar PV loans

¹⁵ "C-PACE." Energize Connecticut. Accessed November 6, 2014: <http://www.c-pace.com/>

¹⁶ "Energizing Clean Energy Finance." Connecticut Clean Energy Finance and Investment Authority. Accessed November 25, 2014: <http://www.ctcleanenergy.com/AboutCEFA/AnnualReport/tabid/136/Default.aspx>

¹⁷ "Overview." Hawaii State Energy Office. Accessed November 6, 2014: <http://energy.hawaii.gov/testbeds-initiatives/gems/gems-overview>

¹⁸ "Government message no. 1314." (2013). Neil Abercrombie. Accessed November 6, 2014: <http://www.capitol.hawaii.gov/session2013/bills/GM1314.PDF>

¹⁹ "DBEDT applauds PUC'S approval of green energy market securitization program." (2014). Hawaii State Energy Office. Accessed November 6, 2014: http://energy.hawaii.gov/wp-content/uploads/2011/09/NR_GEMS_FinalPO_10.01.14.pdf

The GEMS program design will include the following financing components:

- Rate reduction bonds - The rate reduction bonds used to capitalize GEMS will be backed by a “green infrastructure fee” utility bill surcharge, with the principal and interest on the bonds repaid by the surcharge and pledged in full to bond investors. The fee will be levied on all utility customers and will be offset by a reduction in the current public benefits fee, resulting in little or no impact to most ratepayers.
- On-bill repayment - GEMS will use the bond proceeds to issue loans, to be repaid by customers from the resulting energy savings via on-bill repayment. The program will also aim to prove the reliability of using the utility bill as a repayment mechanism with the goal of loosening the program’s underwriting criteria and broadening the eligible consumer base over time.

The initial target technology financed by the GEMS program will be distributed solar. However, once GEMS is launched and issues its first set of bonds, it should be able to finance a wider set of clean energy infrastructure, including updates to the grid, energy efficiency, energy storage, renewable generation, liquid natural gas stranded assets, and other utility assets.

New Jersey Energy Resilience Bank

New Jersey proposed creating its energy financing bank in March 2014, using \$200 million from the state’s Community Development Block Grant disaster recovery allocation.²⁰ The New Jersey Energy Resilience Bank’s (NJERB) mission statement is “Realizing energy resilience for New Jersey’s critical facilities through financing and technical assistance.” NJERB is the result of collaboration between the New Jersey Board of Public Utilities (NJBPU) and the Economic Development Authority (NJEDA).

NJERB will offer grants and loans to address unmet funding needs. NJERB will offer grants and forgivable loans for up to 40 percent of the unmet funding needs, and will meet the remaining 60 percent through low-interest, amortizing loans. The remaining funding needs will be provided by lenders or investors. Because NJERB has been created with the explicit goal of making New Jersey’s infrastructure more resilient, its funds cover renewable energy infrastructure but not energy efficiency improvements. Specifically, “eligible technologies must be constructed to operate isolated from the electric utility grid (islanding), be able to start up without a direct connection to the electric grid (blackstart) when the grid is down due to

New Jersey Energy Resilience Bank	
Organizational Structure	
State infrastructure bank, reporting to both the NJBPU and the NJEDA	
Method of Capitalization	
<ul style="list-style-type: none"> • \$200 million from federal disaster funds 	
Private-Sector Capital Leveraged	
<ul style="list-style-type: none"> • Banks • Specialty lenders 	
Financial Services Offered	
<ul style="list-style-type: none"> • Low-interest loans • Grants 	

²⁰

<http://www.nj.gov/dca/divisions/sandyrecovery/pdf/NJ%20Action%20Plan%20Substantial%20Amendment%20202%20final.pdf>



extreme weather events, and have the capability to operate at critical load.”²¹ The NJERB issued a call for project applications at the end of October 2014.

New York Green Bank

In 2013, Governor Andrew Cuomo announced the creation of the New York Green Bank (NYGB), a \$1 billion “state-sponsored investment fund” aimed at attracting private-sector financing for clean energy projects.²² NYGB was created as a division of NYSEERDA, a state agency, and is intended to supplement NYSEERDA’s current programs through a focus on leveraging private capital. As a first step, NYGB is working with NYSEERDA’s existing finance and incentive programs to streamline current offerings and avoid overlap.

NYGB aims to enable greater investment in New York’s growing clean energy economy by opening up financing markets and expanding the availability of capital using innovative financing solutions and strategic partnerships with private-sector intermediaries.

NYGB’s policy objectives are as follows:²³

- Provide a bridge to self-sustaining, efficient financing markets for clean energy and energy efficiency.
- Leverage private-sector capital to develop sustainable clean energy financing markets.
- Increase the amount of clean energy deployed for every dollar of state money spent or invested in the clean energy sector.
- Animate capital markets for the clean energy sector, so as to reduce the cost of capital and the need for government support.
- Spur economic development and clean energy jobs across the state.

In support of its policy objectives, NYGB released its first request for proposal (RFP) targeting “private-sector intermediaries in order to alleviate the foregoing market barriers, thereby mobilizing the flow of private capital to fill the existing clean energy finance market gaps.”²⁴ The RFP emphasizes NYGB’s intent

New York Green Bank
Organizational Structure
State agency under NYSEERDA, established by order of the NY Public Service Commission (PSC) in 2013
Method of Capitalization
<ul style="list-style-type: none"> • System benefit charge • RGGI proceeds
Private-Sector Capital Leveraged
<ul style="list-style-type: none"> • Banks • Specialty lenders • Energy service companies (ESCOs) • Warehouse for Energy Efficiency Lending (WHEEL) • Energy Service Agreements (ESAs)
Financial Services Offered
<ul style="list-style-type: none"> • Co-lending • Credit facilities • Senior debt • Loan guarantees

²¹ http://www.nj.gov/bpu/newsroom/announcements/pdf/20141020_erb_press.pdf

²² “New York Green Bank frequently asked questions.” (2014). New York Green Bank, A Division of NYSEERDA. Accessed October 8, 2014: <http://greenbank.ny.gov/-/media/greenbank/files/NY-Green-Bank-FAQ.pdf>

²³ “New York Green Bank frequently asked questions.” (2014). New York Green Bank, A Division of NYSEERDA. Accessed October 8, 2014: <http://greenbank.ny.gov/-/media/greenbank/files/NY-Green-Bank-FAQ.pdf>

²⁴ “RFP 1: Clean energy financing arrangements.” New York Green Bank, a Division of NYSEERDA. Accessed October 8, 2014: <http://greenbank.ny.gov/RFP1.aspx>

to work collaboratively with the private sector to achieve its stated objectives, avoiding subsidies or competition that could significantly alter market dynamics. Through strategically designed arrangements and various forms of credit enhancement, NYGB seeks to support the private sector, mitigating the perceived risks of investing in the large-scale implementation of clean energy technologies.

In late October 2014, NYGB announced its first seven transactions, which will produce clean energy investments in New York totaling over \$800 million. Most of the projects are for renewable or cogeneration projects, with locations that include New York City and upstate New York.

To date, NYGB has been funded through utility bill surcharges and RGGI auction proceeds. NYGB raised \$165.6 million through clean energy surcharges on the state’s investor-owned utility customers and \$52.9 million in auction proceeds from RGGI auctions for a total initial capitalization of \$218.5 million.²⁵ Future funding for NYGB is likely to come from similar sources.

NYGB plans to recapitalize its investments in clean energy projects via fees and, possibly, through interest on its financial services and products, with the goal of maintaining sustainable funding for future project finance and to cover administrative costs. As mature technologies reach broader acceptance and clean energy loan portfolios reach maturity, it is anticipated that the market need for public credit enhancement of clean energy loans will dramatically decrease, leading to reduced participation from NYGB.

Other Entities That Provide Green Bank Functions

California Alternative Energy and Advanced Transportation Financing Authority (CAEATFA)

The California Alternative Energy and Advanced Transportation Financing Authority (CAEATFA) is the largest aggregator of state resources and clean energy financing programs in California. CAEATFA is an official state department housed in the State Treasurer’s Office. The department was originally established in 1980 to provide affordable financing and was re-launched in 2010 to administer a sales tax exclusion for state and local manufacturing of advanced transportation products and for facilities that use alternative energy sources and technologies.

While CAEATFA does not have the words “green bank” in its name, its goals, functions, and programs are in line with the green bank

CAEATFA
Organizational Structure
State agency under State Treasurer’s Office, established by the legislature in 1980/2010
Method of Capitalization
<ul style="list-style-type: none"> • System benefit charge • Annual state budget allocations • Participation fees
Private-sector Capital Leveraged
<ul style="list-style-type: none"> • Banks • Specialty lenders • Lessors
Financial Services Offered
<ul style="list-style-type: none"> • Third-party loans • Leases • PACE

²⁵ “New York Green Bank frequently asked questions.” (2014). New York Green Bank, A Division of NYSEERDA. Accessed October 8, 2014: <http://greenbank.ny.gov/-/media/greenbank/files/NY-Green-Bank-FAQ.pdf>



concept. CAEATFA provides direct and indirect financing for the development and commercialization of advanced transportation and alternative energy technologies, with a goal of reducing air pollution, conserving energy, and promoting economic development through job creation. It supports clean energy investments by working with a variety of partners, including investor-owned utilities (IOUs), the California Public Utilities Commission (CPUC), private-sector clean energy developers, commercial lenders, institutional investors, private financial institutions, and state bond financing agencies.

CAEATFA operations are funded through a state budget allocation—\$27.5 million for the 2014–2015 fiscal year²⁶—and fees paid by program participants. In the future, the department aims to be completely self-sustaining using the proceeds from fees alone. Individual finance programs under CAEATFA draw their financing from a variety of sources.

CAEATFA operates the following financing programs:

- Clean Energy Upgrade Financing Program²⁷ - Under the Clean Energy Upgrade Financing Program, CAEATFA provides financial assistance in the form of a loan loss reserve to financial institutions making loans to finance the installation of residential energy efficiency and renewable energy projects. Financial institutions participating in the program receive a 15 percent loan loss reserve contribution for each qualified loan enrolled (a 6:1 leverage ratio), and CAEATFA may provide up to 100 percent coverage on qualified loan defaults. The program was launched in August 2012.

Financing for Alternative Fuel Vehicle (AFV) Projects

While green banks have traditionally focused on energy efficiency and renewable energy projects for buildings, there is also an opportunity for green banks to apply their authority, expertise, and resources to accelerate deployment of clean energy technologies in the transportation sector by expanding access to capital for alternative fuel vehicle (AFV) and refueling infrastructure projects.

AFVs are vehicles powered by electricity, natural gas, hydrogen, or other non-petroleum-based fuels and offer many of the same benefits as clean energy technologies in other sectors. Deployment of AFVs can improve air quality, reduce greenhouse gas emissions, and enhance energy security.

Some existing green banks have been granted the authority to establish AFV programs. *(Continued next page...)*

²⁶ “Bill analysis: Bill number SB 1271.” (2014). California Senate Governance & Finance Committee. Accessed October 8, 2014: http://www.leginfo.ca.gov/pub/13-14/bill/sen/sb_1251-1300/sb_1271_cfa_20140403_133805_sen_comm.html

²⁷ “Clean energy upgrade financing program - assembly bill (AB) X1 14.” California Alternative Energy and Advanced Transportation Financing Authority. Accessed October 8, 2014: http://www.treasurer.ca.gov/caeatfa/abx1_14/index.asp

AFV Financing (cont'd)

Connecticut Green Bank's authorizing legislation includes AFV projects in the scope of clean energy. New York Green Bank has the authority to establish financing programs for AFV projects, and it specifically included electric vehicle charging infrastructure projects in its first request for proposals.

As green banks consider establishing AFV finance programs, they can draw from the examples and lessons of the existing funding programs:

- 1) California Energy Commission's Alternative and Renewable Fuel and Vehicle Technology Program, which offers loans for AFV infrastructure.
- 2) Oregon Department of Energy's State Energy Loan Program, which offers low-interest loans for AFVs and infrastructure.
- 3) Vermont Economic Development Authority's Electric Vehicle Charging Station Loan Program, which offers loans for public charging stations.

- PACE Loss Reserve Program²⁸ - In September 2013, California authorized CAEATFA to establish a PACE Loss Reserve Program in response to concerns raised by the Federal Housing Finance Agency (FHFA), which regulates Fannie Mae and Freddie Mac. The PACE Loss Reserve Program has been funded with \$10 million from the state budget and has eight PACE programs currently enrolled.
- California Hub for Energy Efficiency Financing (CHEEF)²⁹ - Established by the CPUC in September 2013, CHEEF will serve an administrative and oversight role for a series of planned energy financing pilot programs, which include a suite of financial offerings across the residential single family, multifamily, small business, and non-residential sectors. The program will employ various credit enhancement, loan, and lease products, as well as forms of repayment. CHEEF's pilot programs will leverage funds from private-sector lenders, specialty lenders, and lessors. The programs are scheduled to begin in early 2015.

Florida Solar and Energy Loan Fund³⁰

Founded in 2010, the Florida Solar and Energy Loan Fund (SELF) is a St. Lucie County-based nonprofit organization and community development finance institution (CDFI) that targets clean energy investments in underserved regions. Because it does not receive state funding,

Florida SELF
Organizational Structure
Nonprofit CDFI, fully independent.
Method of Capitalization
<ul style="list-style-type: none"> Grants (U.S. DOE) U.S. Treasury CDFI Fund
Private-Sector Capital Leveraged
<ul style="list-style-type: none"> WHEEL model
Financial Services Offered
<ul style="list-style-type: none"> Direct loans PACE

²⁸ "Property assessed clean energy (PACE) loss reserve program." California Alternative Energy and Advanced Transportation Financing Authority. Accessed October 8, 2014: <http://www.treasurer.ca.gov/caeatfa/pace/index.asp>

²⁹ "California decision may catalyze energy efficiency financing." Clean Energy Finance Center. Accessed October 8, 2014: <http://www.cleanenergyfinancecenter.org/2013/09/california-decision-may-catalyze-energy-efficiency-financing/>

³⁰ "Solar and energy loan fund." The Solar and Energy Loan Fund. Accessed November 6, 2014: <http://cleanenergyloanprogram.org/>



Florida SELF does not qualify as a green bank, but its operations are very similar. SELF is currently capitalized by the U.S. Treasury’s CDFI Fund, a grant via the U.S. Department of Energy’s (DOE’s) Energy Efficiency and Conservation Block Grant Program, and individual philanthropic and private-sector investments. SELF is actively seeking additional private and philanthropic capital to further diversify its pool of funding sources.

SELF’s major program is the Clean Energy Loan Fund program, which lends up to \$50,000 to residential and small commercial customers for an interest rate of less than 9 percent over a tenor of up to 15 years. SELF’s approach to financing places an emphasis on project installation and technology quality. While the program offers financing for a wide variety of energy efficiency and renewable energy products, SELF performs research to test and evaluate clean energy technologies prior to approving them in its financing portfolio. Additionally, the program requires that the borrower’s property undergo an energy audit prior to project implementation; the audit informs not only the project itself but also the specific financing terms that the program offers to the customer.

In addition to the Clean Energy Loan Fund program, SELF provides underwriting services for the St. Lucie County Commercial PACE program.

SELF has successfully closed more than 295 loans totaling above \$2.5 million,³¹ with a default rate of fewer than two percent.

Energy Trust of Oregon and Clean Energy Works³²

In 1999, Oregon Senate Bill 1149 established a “public purpose charge” for ratepayers of several utilities, the proceeds of which would be directed toward incenting energy efficiency and renewable energy improvements for residential and business customers. This 3 percent charge on ratepayers provides about \$60 million per year toward the establishment of energy efficiency programs. The Oregon Public Utilities Commission chartered the Energy Trust of Oregon (ETO) as an independent nonprofit to administer the funds.

ETO supports Clean Energy Works (CEW), a lending program that aggregates eligible projects in order to receive ETO financing, passing the savings on to the homeowners.

Energy Trust of Oregon
Organizational Structure
Nonprofit chartered by Oregon PUC, established by a legislative levy of a surcharge
Method of Capitalization
<ul style="list-style-type: none"> • System benefit charge
Private-sector Capital Leveraged
<ul style="list-style-type: none"> • Specialty lenders
Financial Services Offered
<ul style="list-style-type: none"> • Third-party loans

³¹ “Triple bottom line impacts – FY 2014 Q4.” (2014). The Solar and Energy Fund. Accessed November 6, 2014: http://cleanenergyloanprogram.org/solar_energy_loan/SELF%20FY%202014%20Snapshot.pdf

³² “Energy Trust of Oregon: Who we are.” Energy Trust of Oregon. Accessed October 8, 2014: <http://energytrust.org/about/who-we-are/>

Clean Energy Works (CEW) is a separate state-chartered nonprofit that serves as an intermediary, standardizing and aggregating financing products and services for homeowners seeking clean energy improvements. Originating as Clean Energy Works Portland in 2009, CEW operates within a 19-county region in Oregon to give low-cost financing, free home energy assessments, and information on available incentives to homeowners seeking to reduce energy consumption. CEW seeks to provide benefits to the community by improving residents' comfort, to the environment by reducing energy consumption and the use of fossil fuels, and to job creation efforts through the establishment of qualified contractors and technical service providers. CEW partners with private lenders to supply capital for its home energy efficiency loan program. Within its service region, each county is able to select from between 3 to 11 loan products for energy efficiency projects. CEW's Home Energy Efficiency Loan Program, one of its most popular products, is offered in partnership with Craft3, another Oregon nonprofit and a CDFI. The Home Energy Efficiency Loan Program uses the structure set forth through CEW to provide fixed-rate financing to homeowners making energy efficiency improvements. Cash incentives flow through ETO to CEW to subsidize the cost of financing.

Snapshot Summary

Table 1 presents a summary of the green banks and entities that offer green bank functions described above.



Table 1: Green Bank Overview

	Organizational Structure	Method Of Capitalization	Private-Sector Capital Leveraged	Financial Services Offered
Existing Green Banks				
Connecticut Green Bank	Quasi-public agency established by legislature 2011	<ul style="list-style-type: none"> • System benefit charge • RGGI proceeds • Grants • Private capital 	<ul style="list-style-type: none"> • Contracts executed with investors and other lenders 	<ul style="list-style-type: none"> • Third-party loans, leases, and PACE
Hawaii GEMS	State agency working with PUC, established by legislature 2013	<ul style="list-style-type: none"> • System benefit charge backing revenue bonds 	<ul style="list-style-type: none"> • Investors via bond issuances 	<ul style="list-style-type: none"> • On-bill repayment for solar PV loans
New Jersey Energy Resilience Bank	State infrastructure bank	<ul style="list-style-type: none"> • Federal disaster relief funds 	<ul style="list-style-type: none"> • To be determined 	<ul style="list-style-type: none"> • Loans • Grants
New York Green Bank	State agency under NYSEDA, established by order of NY PSC in 2013	<ul style="list-style-type: none"> • System benefit charge • RGGI proceeds 	<ul style="list-style-type: none"> • Banks • Specialty lenders • ESCOs • Warehouse facilities • ESAs 	<ul style="list-style-type: none"> • Co-lending • Credit facilities • Senior debt • Loan guarantees
Entities That Provide Green Bank Functions				
CAEATFA (California)	State agency under State Treasurer's Office, established by legislature 1980/2010	<ul style="list-style-type: none"> • System benefit charge • Annual state budget allocations • Participation fees 	<ul style="list-style-type: none"> • Banks • Specialty lenders • Lessors 	<ul style="list-style-type: none"> • Third-party loans • Leases • PACE
Florida SELF	Nonprofit CDFI, fully independent	<ul style="list-style-type: none"> • Grants (U.S. DOE) • U.S. Treasury CDFI Fund 	<ul style="list-style-type: none"> • Using WHEEL model 	<ul style="list-style-type: none"> • Direct loans • PACE
Energy Trust of Oregon	Nonprofit chartered by Oregon PUC, established by legislative levy of surcharge	<ul style="list-style-type: none"> • System benefit charge 	<ul style="list-style-type: none"> • Specialty lenders 	<ul style="list-style-type: none"> • Third-party loans

Table 2 presents a summary of the key programs offered by the green banks and other entities discussed in this chapter.

Table 2: Snapshot Summary of Green Bank Programs in Other States

State Entity Program Name	Market Sector						EE / RE		Type				Results	
	Residential	Multifamily	Small Business	Commercial / Industrial	MUSH ¹	Nonprofit	Energy Efficiency	Renewable Energy	Credit Enhancement	On-Bill Repayment	Lease	PACE	Number of Projects	Dollar Amount Financed
Existing Green Banks														
CONNECTICUT Green Bank ²														
Solar Lease ³	R		SB	C				RE	CE		L		209	\$ 6,300,000
Solar Loan ⁴	R							RE	CE				141	\$ 2,800,000
Smart-E Loan ⁵	R						EE	RE	CE				104	\$ 1,300,000
Cozy Home ⁶	R						EE	RE	CE				1	\$ 8,500
C-PACE ⁷		MF	SB	C/I	M	NP	EE	RE				P	28	\$ 20,000,000
Campus Efficiency Now					M		EE	RE					2	NA
Lead By Example					M		EE	RE					In development	
HAWAII Green Energy Market Securitization (GEMS)														
On-Bill Repayment	R	MF				NP		RE		OB			In development	
NEW JERSEY Energy Resilience Bank														
No programs yet					M			RE					In development	
NEW YORK Green Bank														
7 Initial Transactions	R	MF	SB	C/I	M	NP	EE	RE	CE		L		In development	
Entities that Provide Green Bank Functions														
CALIFORNIA Alternative Energy and Advanced Transportation Finance Authority (CAEATFA)														
Clean Energy Upgrade ⁸	R						EE		CE				205	\$ 2,700,000
PACE Loss Reserve ⁹	R		SB	C			EE	RE	CE			P	15,000	\$ 250,000,000
CHEEF ¹⁰ (7 pilots)	R	MF	SB	C/I	M	NP	EE		CE	OB	L		In development	
FLORIDA Solar and Energy Loan Fund (SELF) ¹¹														
Clean Energy	R		SB	C			EE	RE	CE				295	\$ 2,500,000



State Entity Program Name	Market Sector						EE / RE		Type				Results	
	Residential	Multifamily	Small Business	Commercial / Industrial	MUSH ¹	Nonprofit	Energy Efficiency	Renewable Energy	Credit Enhancement	On-Bill Repayment	Lease	PACE	Number of Projects	Dollar Amount Financed
Loans ¹²														
OREGON - Energy Trust of Oregon														
Home Energy Efficiency ¹³	R						EE		CE	OB			2,460	\$ 23,100,000

¹ MUSH = Municipalities, universities, schools, and hospitals. Also known as the institutional sector.

² Connecticut results are from CEFA Stakeholder Webinar, March 19, 2014. See www.ctcleanenergy.com/Portals/0/CEFA%20Update_Informational%20Webinar_041914.pdf.

³ CT Solar Lease results as of March 2014. Launched September 2013.

⁴ CT Solar Loan results are as of March 2014. Launched July 2013.

⁵ Smart-E results are as of January 2014. Launched May 2013.

⁶ Cozy Home is for affordable housing. Results are as of March 2014. Launched July 2013.

⁷ C-PACE results as of March 2014. Launched January 2013.

⁸ Clean Energy Upgrade results as of December 2013. Launched December 2012. See www.treasurer.ca.gov/caeatfa/annual/2013.pdf.

⁹ California PACE results are for HERO Residential PACE, the largest of the 8 PACE programs. Launched November 2011. From a presentation by Renovate America to the Association of Energy Service Professionals, 9/2014, and a press release dated July 2014, at <http://pacenow.org/renovate-america-closes-50-million-equity-investment>.

¹⁰ CHEEF = California Hub for Energy Efficiency Financing,

¹¹ The Florida Solar and Energy Loan Fund covers only a small portion of the state.

¹² Clean Energy Loan Fund results as of September 2014. Launched February 2011. See http://cleanenergyloanprogram.org/solar_energy_loan/SELF_Overview_FY%202014%2009302014.pdf.

¹³ The Home Energy Efficiency Loan program is offered through Clean Energy Works Oregon and Craft3, a specialty lender. Results as of December 2013. Launched 2009. See www.craft3.org/2013_Annual_Report/index.html.

4. Overview of Maryland's Existing Clean Energy Finance Programs

Section Summary

- Maryland has numerous financing programs across multiple sectors that are operated by a variety of entities in a decentralized manner.
- At an average of \$20 million in lending per year, the amount of financing available through these programs is insufficient to meet the State's energy efficiency and renewable energy financing needs. Private-sector capital will need to be leverage to meet this need.
- MCEC plays an important role in connecting related resources to needs and is established as a trusted third-party advisor for consumers looking to deploy solutions or find financial assistance. MCEC's MCAP and MHELP programs have been effective at leveraging private-sector capital.
- Private-sector financing options are readily available in some sectors and for certain technologies, but private-sector financing gaps still exist in many areas.

Introduction

A number of public and private clean energy financing programs currently exist in Maryland, some of which have been in place for more than 20 years. These programs offer loans, leases, on-bill financing, power purchase agreements, tax-exempt bonds, and other innovative contracts to finance clean energy projects for residential, multifamily, and commercial property owners. Energy efficiency upgrades are the most common target technologies for these programs, although several also finance renewable energy installations.

Some of the oldest programs, such as the State Agency Loan Program (SALP), have existed for 20 years, but most programs are more recent, including MCAP, which was launched in 2012. Many of these more recent efforts are still in the pilot phase, such as Pepco and Baltimore Gas and Electric's (BGE's) Small Business Energy Advance programs, both of which fall under the EmPOWER program umbrella. State agencies have also put significant effort into examining the potential for new finance programs to target technologies like microgrids and rooftop solar systems; dedicated finance programs targeting these clean energy sectors have not yet been established.

Maryland financing programs have an average energy efficiency and renewable energy financing volume of \$20 million per year, broken out by sector as follows: \$9.7 million for municipal, \$4.5 million for residential, \$3.2 million for multifamily, \$1.5 million for commercial, and \$1.1 million across multiple sectors.

This section describes the Maryland clean energy finance programs that are currently available, have just become available, or are expected to be available soon.



Public-Sector Clean Energy Finance Programs

Maryland's state-funded programs expand options for clean energy financing through a variety of approaches, including publicly funded direct loans and credit enhancements such as loan loss reserves. To date, these public clean energy financing programs have focused principally on energy efficiency projects.

Be SMART

The Be SMART program provides financing for energy efficiency improvements to residential, multifamily, and commercial properties. The program was seeded in 2010 with \$20 million in American Recovery and Reinvestment Act funds through the DOE's Better Buildings program and is administered by the Maryland Department of Housing and Community Development (DHCD). It includes three component programs: the Be SMART Home Program, the Be SMART Multifamily Program, and the now-closed Be SMART Business Program.³³

Be SMART Home Program

Homeowners are eligible for financing through the Be SMART Home Program if they have a credit score of at least 640, a debt-to-income ratio of 50 percent or less, and a verified income. As of October 2014, a total of 89 loans have been issued through the Be SMART Home Program for a total of \$1,312,924, averaging \$14,752 per loan. From the program's start in 2010 through November 2013, 63 loans were issued totaling \$848,478 and averaging \$13,468 per loan. Program demand increased over the past year; the program issued 26 loans between November 2013 and October 2014, totaling \$464,446 and averaging \$17,863 per loan.³⁴

The program offers unsecured loans for 3-, 5-, and 10-year terms, although 90 percent of loans are for 10-year terms. The most commonly funded improvements have been ENERGY STAR appliance upgrades, duct replacement and installation, upgraded heating and cooling units, energy-efficient windows, and cool roofs. The most popular jurisdictions for loans in descending order are Prince George's County, Baltimore City, Allegheny County, Frederick County, Montgomery County, and Somerset County.³⁵

According to DOE guidelines, loan-associated energy savings must be at least 15 to 25 percent of household energy use. The interest rates and loan amounts available through the program changed in November 2013. At the beginning of the program, loans of up to \$15,000 were issued at different interest rates depending on whether the applicant had an accompanying home energy audit. Loans

Be Smart Home
Years Active
2010 to present
Eligible Participants
Residential
Target Technologies
Energy efficiency
Financing Products
Loans
Status
89 projects; \$1.3 million in loans

³³ "Be SMART." Maryland Department of Housing and Community Development. Accessed September 15, 2014: <http://www.dhcd.maryland.gov/Website/Programs/BeSmart/Default.aspx>

³⁴ Mello, J., and Amoah, W. (2014, October 9). Phone interview. (M. Tubman, Interviewer)

³⁵ Mello, J., and Amoah, W. (2014, October 9). Phone interview. (M. Tubman, Interviewer)

issued after the completion of an audit were for whole-house energy efficiency projects at an interest rate of 4.99 percent. Loans issued without an audit could finance only ENERGY STAR appliance upgrades at an interest rate of 6.99 percent. Starting in November 2013, the program requires an energy audit for all loans, and now offers a maximum loan amount of \$25,000 with a 4.99 percent interest rate.³⁶

Be SMART Multifamily Program

Multifamily property owners are eligible for loans or for loan guarantees under the Be SMART Multifamily Program. The program gives priority to owners of rental properties located in communities participating in Maryland's Main Street Maryland program, and in the counties in which those communities are located.

The Be SMART Multifamily Program offers direct loans for the purchase and installation of energy-efficient equipment. Each loan's interest rate is based on project risk and borrower creditworthiness, and typically ranges between zero and 2 percent.³⁷ Program loans may be subordinated to conventional financing and allow for repayment on a cash flow basis. The program also offers loan loss reserves to attract private lenders to these markets. For both direct loans and private loans backed by loan loss reserves, participants are required to adhere to certain reporting and other requirements, including maintaining an agreed-upon percentage of affordable housing units.³⁸

The Be SMART Multifamily Program has provided a total of \$12,086,000 in financing support for 10 projects. Six projects received a loan, four projects received loan loss reserve coverage, and one received both. In 2014, a single project received loan loss reserve coverage that was large enough to fully utilize allocated program funding through 2015.³⁹

Notably, all but one loan issued under this program have been part of a larger rehabilitation plan involving multiple financing sources. Be SMART loans that are part of larger financing packages must share the same financing terms as the larger package. The one stand-alone Be SMART loan specifies that the loan term not exceed the weighted economic life of the energy efficiency measures undertaken, which is typically between five and 15 years.⁴⁰

Be Smart Multifamily
Years Active
2010 to present
Eligible Participants
Multifamily
Target Technologies
Energy efficiency Renewable energy
Financing Products
Loans; loan loss reserves
Status
10 projects; \$12.1 million in loans and loan loss reserves

Be Smart Business
Years Active
2010 to 2012
Eligible Participants
Commercial
Target Technologies
Energy efficiency
Financing Products
Loans
Status
5 projects; \$737,000 in loans

³⁶ Mello, J., and Amoah, W. (2014, October 9). Phone interview. (M. Tubman, Interviewer)

³⁷ England, D. (2014, October 8). Phone interview. (M. Tubman, Interviewer)

³⁸ "Be SMART multifamily." Maryland Department of Housing and Community Development. Accessed November 6, 2014: <http://www.mdhousing.org/website/programs/BeSmart/Multifamily.aspx>

³⁹ England, D. (2014, October 8). Phone interview. (M. Tubman, Interviewer)

⁴⁰ England, D. (2014, October 8). Phone interview. (M. Tubman, Interviewer)



Be SMART Business Program

The Be SMART Business Program launched in 2010 and closed in September 2012. The program made loans to businesses and commercial building owners located in revitalization areas within designated Sustainable Communities, Main Street Maryland Communities, Baltimore Main Street communities, and Arts and Entertainment Districts.⁴¹ The program made five loans totaling \$737,429.

Jane E. Lawton Conservation Loan Program

MEA administers the Jane E. Lawton Conservation Loan Program, a revolving loan fund that provides financing for nonprofits, local governments, and businesses to make energy-saving upgrades. The Maryland General Assembly created this program in 2008 by consolidating two long-standing programs: the Community Energy Loan Program, which used funds from the Energy Overcharge Restitution Program to provide assistance to nonprofits and government agencies making energy efficiency improvements, and the Energy Efficiency Development Loan Program, which financed energy efficiency improvements for businesses.⁴²

Since the program's creation in fiscal year 2009, MEA has made 18 loans totaling about \$5.2 million. In recent years, the program's annual budget has been between \$1.5 million and \$1.75 million.⁴³

Entities eligible to apply for financing through this program include local governments, nonprofits, and businesses. The program will lend for a broad range of energy efficiency projects, including renewable energy projects that save energy, such as solar thermal and geothermal, but not those that generate electricity such as photovoltaics and wind.⁴⁴ The program uses a revolving loan fund to provide loans typically between \$50,000 and \$500,000. However, applications are considered on a case-by-case basis, and loans have been issued for as little as \$40,000 and as large as \$1 million.⁴⁵ Interest rates have ranged from zero to 2.5 percent,⁴⁶ with a 2 percent interest rate for all loans to be issued in fiscal year 2015. The program reserves \$500,000 of new loan

Jane E. Lawton
Years Active
2008 to present
Eligible Participants
Nonprofits, local governments, businesses, and others
Target Technologies
Energy efficiency
Financing Products
Loans
Status
18 projects; \$5.2 million in loans (since program consolidation)

⁴¹ "Be SMART business." Maryland Department of Housing and Community Development. Accessed September 15, 2014: <http://www.dhcd.maryland.gov/Website/Programs/BeSmart/Business.aspx>

⁴² "Jane E. Lawton loan program process evaluation report." (2013). GDS Associates, Inc. Maryland Energy Administration.

⁴³ Bresette, D. (2014, September 26). Interview. (M. Tubman, Interviewer)

⁴⁴ "Jane E. Lawton conservation loan program." U.S. Department of Energy. Accessed September 15, 2014: <http://www.energy.gov/savings/jane-e-lawton-conservation-loan-program>

⁴⁵ "Jane E. Lawton loan program process evaluation report." (2013). GDS Associates, Inc. Maryland Energy Administration.

⁴⁶ "Jane E. Lawton loan program process evaluation report." (2013). GDS Associates, Inc. Maryland Energy Administration.

funding each year for loans to nonprofits. The program has \$1.5 million available for new loans in fiscal year 2015.⁴⁷

The program's authority was recently expanded to allow it to offer credit enhancements, such as loan-loss reserves, guarantees, insurance, and interest rate buy-downs. These credit enhancements will be publicly announced once they have been finalized by MEA, potentially along with a formal solicitation for eligible projects.^{48,49} Project energy savings repay loans and thus provide capital for future loans.⁵⁰

Maryland Clean Energy Capital (MCAP)

MCEC was established by the Maryland General Assembly in 2008 and authorized to issue tax-exempt bonds through the MCAP program to improve energy efficiency at nonprofits, municipal governments, universities, schools, and hospitals. Bonds can be used to finance any projects that yield energy savings, including upgrading or installing HVAC equipment; lighting; boilers; windows; water conservation; combined heat and power; and renewable energy installations such as solar, wind, and geothermal projects. MCAP's first supporting bond was issued in December 2012.⁵¹

There is no limit to the size of the bonds issued other than the appetite of the bond market. However, MCAP is typically an attractive finance tool for projects over \$2 million that are large enough to bear the fixed transaction costs. Market rates and individual project creditworthiness determine the bond's interest rate, which is usually from 3 to 4 percent for a 10-year bond.⁵² Since December 2012, three bonds have been issued totaling \$15 million.⁵³

To access this bond financing, a participant contracts with an energy services company (ESCO) to conduct an energy audit and then determine the scope and project plan for efficiency improvements or renewable energy installation. The ESCO also determines the projected dollar value of resulting energy

MCAP
Years Active
2008 to present
Eligible Participants
Nonprofits, municipal governments, universities, schools, hospitals
Target Technologies
Energy efficiency
Financing Products
Tax-exempt bonds
Status
3 projects; \$15 million in bonds

⁴⁷ "Jane E. Lawton conservation loan program." Maryland Energy Administration. Accessed September 15, 2014: <http://energy.maryland.gov/Govt/janeelawton.html>

⁴⁸ "14.26.01.18: Credit enhancements." Office of the Secretary of State. Accessed October 1, 2014: <http://www.dsd.state.md.us/comar/getfile.aspx?file=14.26.01.18.htm>

⁴⁹ Bresette, D., and St. Jean, D. (2014, October 1). Phone interview. (M. Tubman, Interviewer)

⁵⁰ "Jane E. Lawton conservation loan program." Maryland Energy Administration. Accessed September 15, 2014: <http://energy.maryland.gov/Govt/janeelawton.html>

⁵¹ "Maryland Clean Energy Center launches capital financing program." (2012). Maryland Clean Energy Center. Accessed September 14, 2014: <http://www.mdcleanenergy.org/maryland-clean-energy-center-launches-capital-financing-program>

⁵² "MCEC Maryland clean energy capital financing program FAQs." Maryland Clean Energy Center. Accessed September 16, 2014: <http://www.mdcleanenergy.org/maryland-clean-energy-capital-financing-program-FAQs>

⁵³ Daly, T. (2014, September 23). Interview. (M. Tubman, Interviewer)



savings and/or power purchase agreements. With a project plan, the ESCO approaches MCEC to finance the project through MCAP.⁵⁴

MCEC enters into two contracts for the project. One contract is a performance contract with the ESCO and the second is a shared energy savings agreement with the participant. MCEC then sells tax-exempt bonds on the private bond market to raise the project's capital. The ESCO uses that capital to install the designated energy efficiency measures, as well as to measure and verify the actual energy savings. After the project's completion, revenue from energy savings or renewable generation accrues to the participant, who then pays MCEC to make payments on the bond. The ESCO guarantees the energy savings and must make up the difference on the bond payment if the energy savings fall short. Meanwhile, the participant is able retain savings in excess of the bond payment.⁵⁵

The MCAP approach offers participants several benefits. First, the participants do not need to use their own capital for the improvement, which is especially useful for capital-constrained entities. Second, the expected project savings often exceed the obligations to MCEC. Third, because MCEC is the borrower, indebtedness will not count against the participant's borrowing capacity.⁵⁶

Maryland Home Energy Loan Program (MHELP)

MHELP helps finance residential energy efficiency improvements through direct loans provided by a partnership between MEA and MCEC. Individuals are eligible for MHELP loans if their homes are used as a primary residence in Maryland, if they have a credit score of at least 620, and if they are deemed able to repay the loan.⁵⁷ Initial program funding came from the American Recovery and Reinvestment Act in 2009 with \$3.44 million in seed money.⁵⁸ Since the program began issuing loans in 2010, \$18 million in loans have been issued to finance 1,900 projects. The average loan size is \$9,500.⁵⁹

Qualifying improvements include significantly improved insulation; duct sealing; equipment replacement such as water heaters, HVAC, and furnaces; repairs

MHELP	
Years Active	2009 to present
Eligible Participants	Residential
Target Technologies	Energy efficiency
Financing Products	Loans
Status	1,900 projects; \$18 million in loans

⁵⁴ "MCEC Maryland clean energy capital financing program FAQs." Maryland Clean Energy Center. Accessed September 16, 2014: <http://www.mdcleanenergy.org/maryland-clean-energy-capital-financing-program-FAQs>

⁵⁵ "Financing energy efficiency and renewable energy projects in Maryland." Maryland Clean Energy Center. Accessed September 16, 2014: <http://mcap.webflow.com/>

⁵⁶ "MCEC Maryland clean energy capital financing program FAQs." Maryland Clean Energy Center. Accessed September 16, 2014: <http://www.mdcleanenergy.org/maryland-clean-energy-capital-financing-program-FAQs>

⁵⁷ "Program information." (2014). Maryland Clean Energy Center. Accessed September 15, 2014: <http://www.mcecloans.com/program-information/>

⁵⁸ "Maryland home energy loan program (MHELP)." (2012). GDS Associates, Inc. Maryland Energy Administration.

⁵⁹ Daly, T. (2014, September 23). Interview. (M. Tubman, Interviewer)

required to install energy measures or correct health and safety issues associated with energy measures; weather stripping; and energy monitoring equipment.⁶⁰ Of these, HVAC replacement is the most common improvement financed with MHELP loans.⁶¹

Loan eligibility and available loan characteristics have changed since the program started. At the outset, loan characteristics depended on whether the applicant had an accompanying home energy audit. Loans for whole-house energy efficiency projects issued after a completed audit were available for \$1,500 to \$30,000, had a 6.99 percent interest rate, and had a term of up to 10 years. Loans issued without an audit could finance the same amount but at a higher 9.99 percent interest rate for up to 10 years.⁶² As of April 15, 2014, the two categories were combined, and the program now offers loans for between \$1,500 and \$20,000 at a 9.99 percent interest rate.

State Agency Loan Program (SALP)

The State Agency Loan Program provides financing for state agencies to improve energy efficiency in state facilities. The program began in 1991 and was capitalized with \$3 million in funds from the Energy Overcharge Restitution Fund between 1991 and 1996.⁶³ In 2009, Maryland added \$800,000 to the fund through proceeds from allowance auctions in the RGGI. In 2010, \$6.9 million was added from Maryland's American Recovery and Reinvestment Act funds.⁶⁴

MEA solicits projects from state agency facility managers and energy coordinators each October and November. Facility managers may apply for eligible improvements, including lighting upgrades, controls, boilers, chillers, and other energy equipment.⁶⁵ To date, most loans have been for lighting improvements and HVAC retrofits.⁶⁶

SALP
Years Active
1991 to present
Eligible Participants
State agencies
Target Technologies
Energy efficiency
Financing Products
No-interest loan with administrative fee
Status
55 projects; more than \$24 million in loans (since 1998)

The program does not charge interest on its loans, but does charge a one percent administrative fee. An agency repays loans through its fuel and utility budget, based on energy cost savings resulting from the

⁶⁰ "Home energy loan FAQ's." (2014). Maryland Clean Energy Center. Accessed September 15, 2014: <http://www.mcecloans.com/faqs/>

⁶¹ Daly, T. (2014, September 23). Interview. (M. Tubman, Interviewer)

⁶² "Maryland home energy loan program (MHLP) recommendation follow-up report." (2013). Maryland Energy Administration.

⁶³ "State agency loan program." (2014). U.S. Department of Energy. From Database of State Incentives for Renewables and Efficiency. Accessed September 18, 2014: http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=MD08F

⁶⁴ "State agency loan program." Maryland Energy Administration. Accessed September 14, 2014: <http://energy.maryland.gov/Govt/stateLoan.html>

⁶⁵ "State agency loan program." Maryland Energy Administration. Accessed September 14, 2014: <http://energy.maryland.gov/Govt/stateLoan.html>

⁶⁶ St. Jean, D. (2014, September 29). Interview. (M. Tubman, Interviewer)



project.⁶⁷ The program has financed 55 projects through more than \$24 million in loans since 1998, with loans ranging in size from \$15,000 to \$2.9 million and an average loan size of about \$445,000. The program is estimated to have saved 446,667 megawatt hours of electricity since 1992.⁶⁸ SALP financing is frequently used to supplement large energy performance contracts. Since 1992, 63 percent of projects have supported large energy performance contracts discussed later in this chapter.⁶⁹

Multifamily Portfolio Energy Retrofit Customer Investment Fund (CIF) Program

As part of the merger of Exelon and Constellation Energy in 2012, the Multifamily Portfolio Energy Retrofit Customer Investment Fund (CIF) Program was established to make energy efficiency improvements to existing affordable multifamily properties. DHCD received \$3.7 million to establish the program and has already issued one loan for \$890,000. An additional two loans may be issued later in 2014, but the value of those loans has not yet been determined.⁷⁰

Existing, affordable rental properties in BGE's service territory that currently receive DCHD support are eligible for financing through this program. Properties may include master-metered apartment buildings, townhouses, single family homes, single room occupancy, and shared housing facilities with five or more units. Participating properties must meet affordability requirements to be eligible.⁷¹ Properties must complete a DCHD-approved audit.⁷²

Multifamily CIF	
Years Active	2012 to present
Eligible Participants	Multifamily
Target Technologies	Energy efficiency Renewable energy
Financing Products	Loans
Status	1 project; \$890,000 in loans

The program issues direct loans at interest rates of between zero and two percent.⁷³ To qualify for 100 percent financing, projects must meet a savings-to-investment ratio of at least 1.1. Partial financing is allowed for projects that have a savings-to-investment ratio of less than 1.1 contingent upon cost sharing.⁷⁴

⁶⁷ "State agency loan program." Maryland Energy Administration. Accessed September 14, 2014:

<http://energy.maryland.gov/Govt/stateLoan.html>

⁶⁸ St. Jean, D. (2014, September 29). Interview. (M. Tubman, Interviewer)

⁶⁹ St. Jean, D. (2014, September 29). Interview. (M. Tubman, Interviewer)

⁷⁰ England, D. (2014, October 8). Phone interview. (M. Tubman, Interviewer)

⁷¹ "Multifamily portfolio energy retrofit customer investment fund (CIF) program." Maryland Department of Housing and Community Development. Accessed October 10, 2014:

<http://www.dhcd.state.md.us/Website/Programs/cif/Default.aspx>

⁷² "Multifamily portfolio energy retrofit customer investment fund (CIF) program." Maryland Department of Housing and Community Development. Accessed October 10, 2014:

<http://www.dhcd.state.md.us/Website/Programs/cif/Default.aspx>

⁷³ England, D. (2014, October 8). Phone interview. (M. Tubman, Interviewer)

⁷⁴ "Multifamily portfolio energy retrofit customer investment fund (CIF) program." Maryland Department of Housing and Community Development. Accessed October 10, 2014:

<http://www.dhcd.state.md.us/Website/Programs/cif/Default.aspx>

Public Clean Energy Grant Programs

The State of Maryland offers grant programs, many of which MEA administers, that complement finance programs. MEA grant programs target residential, commercial, and local government buildings and the transportation sector. While these grant programs are not clean energy financing programs per se (since they provide funds directly without expectation of repayment), they may complement or substitute for finance programs.

Depending on the specific program, grants can be obtained by individuals, businesses, or local governments.⁷⁵ Residential grant programs include the Clean Burning Wood Stove Grant Program, Maryland Statewide Farm Energy Audit Program, and Residential Clean Energy Grant Program. Business grant programs include the Commercial Clean Energy Grant Program and the Game Changer Program: Energy Innovation Competitive Grant. State and local government grant programs include the EmPOWER Clean Energy Communities Grants program and the Maryland Smart Energy Communities program. Transportation grants include the “Fuel Up Maryland” Service Station Energy Resiliency Grant Program, Maryland Electric Truck (MET) Voucher Program, and the Maryland Idle Reduction Technology Grant Program.⁷⁶

Maryland Smart Energy Communities

The Maryland Smart Energy Communities program is a recently established clean energy grant program that provides funding for local governments to realize energy savings and install renewable energy facilities. To join the program, local governments must adopt two of three model policies: a reduction of energy consumption in local government-owned buildings by 15 percent within five years of a baseline year; meeting 20 percent of local government building energy needs with newly installed distributed renewable energy by 2022; or a comprehensive program to reduce petroleum consumption in all local government-owned vehicles by 20 percent within five years of a baseline year. These policies must be implemented through the appropriate local government mechanism.⁷⁷ The funding agreements spell out how the local government’s compliance with the policies will be measured and enforced.

Smart Energy Communities
Years Active
2013 to present
Eligible Participants
Local governments
Target Technologies
Energy efficiency Renewable energy
Financing Products
Grants
Status
\$4 million available in total funding

MEA provides grants to help community projects reach their established goals, although available funding will not be sufficient to cover all steps needed to achieve policy objectives. MEA has \$4 million from which to make grants, with a dedicated split between energy efficiency programs (75 percent) and

⁷⁵ “All incentives.” Maryland Energy Administration. Accessed September 26, 2014:

<http://energy.maryland.gov/allincentives.html>

⁷⁶ “All incentives.” Maryland Energy Administration. Accessed September 26, 2014:

<http://energy.maryland.gov/allincentives.html>

⁷⁷ “Maryland smart energy communities.” Maryland Energy Administration. Accessed September 20, 2014:

<http://energy.maryland.gov/Govt/smartenergycommunities/>



renewable energy installations (25 percent).⁷⁸ MEA determines a community's funding using a formula that considers both individual community population and the total number of participating communities. MEA anticipates grants of between \$30,000 and \$500,000.⁷⁹

The program was launched in February 2013; communities had to apply for the grant by April 2013.⁸⁰ Currently, 26 incorporated municipalities, seven counties, and Baltimore City have applied for grants.⁸¹

Emerging Public-Sector Finance Opportunities and Programs

Property Assessed Clean Energy (PACE)

In 2014, the Maryland General Assembly made important technical revisions to the 2009 language that authorized local governments to institute PACE programs for commercial properties.⁸² PACE programs enable property owners to finance clean energy improvements and repay the cost through a special assessment on their property taxes. PACE has several advantages:

- Long repayment terms up to 25 years help stretch out the payments and make them smaller.
- Assessments can transfer to a new owner upon sale of the property.
- PACE liens provide very strong security for the financing, helping to lower interest rates.
- The strong security also helps to simplify and speed up underwriting.

The security of PACE liens rests on the priority of property tax liens over mortgage liens in the event of foreclosure. In effect, PACE liens step in front of even the first mortgage lender. This priority led the Federal Housing Finance Agency (FHFA) to prohibit Fannie Mae and Freddie Mac from accepting mortgages on homes with PACE liens; FHFA reportedly loosened the prohibition in early November 2014, re-opening the door for residential PACE programs nationwide. To date, most PACE programs have focused on the commercial sector.

PACE programs	
Years Active	2014 state authorization
Eligible Participants	Commercial
Target Technologies	Energy efficiency Renewable energy
Financing Products	Repaid through an assessment on the property tax bill
Status	No local programs operational yet

⁷⁸ "Maryland smart energy communities." Maryland Energy Administration. Accessed September 20, 2014:

<http://energy.maryland.gov/Govt/smartenergycommunities/>

⁷⁹ "Maryland smart energy communities: FAQ page." Maryland Energy Administration. Accessed September 20, 2014: <http://energy.maryland.gov/Govt/smartenergycommunities/faq.html>

⁸⁰ "Maryland Energy Administration announces the Maryland smart energy communities program." (2013). Maryland Energy Administration. Accessed September 20, 2014:

<http://energy.maryland.gov/documents/MarylandEnergyAdministrationAnnouncesTheMarylandSmartEnergyCommunitiesProgram262013.pdf>

⁸¹ "Maryland smart energy communities." Maryland Energy Administration. Accessed September 20, 2014:

<http://energy.maryland.gov/Govt/smartenergycommunities/>

⁸² "Chapter 472 (Senate bill 186) Clean energy loan programs – private lenders – collection of loan payments." (2014). State of Maryland. From 2014 Laws of Maryland. Accessed September 18, 2014:

http://mgaleg.maryland.gov/2014RS/Chapters_noln/CH_472_sb0186t.pdf

In response to the 2014 revisions, the Montgomery County Council directed county staff to develop a plan for implementing commercial PACE in the county. While the Montgomery County plan authorizes the county to issue bonds as part of the program, private sources of funding are expected to be used to increase program flexibility and reduce risk to the county.⁸³ Although Montgomery County is moving forward on this plan, the timeline is uncertain because the county will have to put the program's administrative and management structures in place.⁸⁴

The Anne Arundel County Council has also authorized a commercial PACE program for loans greater than \$25,000 with a term of up to 20 years.⁸⁵ Action on the program will be determined by the next County administration.

Regulated Sustainable Energy Contract Program

In 2013, the Maryland General Assembly passed legislation that authorized the MEA to create a Regulated Sustainable Energy Contract Program. The program will allow qualified contractors to provide renewable energy installations and energy efficiency upgrades for residential property owners under regulated sustainable energy contracts. These contracts could be up to \$30,000, billable directly to property owners, recorded in land records, and enforceable by imposition of a lien on the property.⁸⁶

This program is in the initial stages of development. Before full implementation, MEA must perform a feasibility study and create a pilot program. If the pilot is successful, MEA may establish a full program with accompanying regulations. MEA completed the feasibility study in 2014, and plans to develop pilot programs for residential geothermal installations and natural gas conversions that take advantage of high-efficiency natural gas appliances and equipment.⁸⁷

Regulated Sustainable Energy Contract
Years Active
2013 state authorization
Eligible Participants
Residential
Target Technologies
Energy efficiency Renewable energy
Financing Products
Contracts are billable to property owners
Status
Pilot projects are not yet implemented

⁸³ "Commercial PACE." Montgomery County (Maryland) Department of Finance. Accessed September 18, 2014:

<http://www.montgomerycountymd.gov/bonds/commercialpace.html>

⁸⁴ Hagedoorn, R. (2014, September 26). Interview. (M. Tubman, Interviewer)

⁸⁵ "An ordinance concerning: real property taxes – clean energy loan program and property tax surcharge, bill no. 68-14." (2014). County Council of Anne Arundel County, Maryland. Annapolis, Maryland, United States of America. Accessed September 18, 2014:

http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=MD38F&re=1&ee=1

⁸⁶ "House bill 621. Maryland Energy Administration - regulated sustainable energy contract program." (2013). Maryland General Assembly. Accessed September 25, 2014:

http://mgaleg.maryland.gov/2013RS/fnotes/bil_0001/hb0621.pdf

⁸⁷ "Report to the Maryland General Assembly on the administration's progress carrying out the requirements of the act concerning regulated sustainable energy contract program." (2013). Maryland Energy Administration. Accessed September 19, 2014:

<http://energy.maryland.gov/documents/ReporttotheMarylandGeneralAssemblyontheAdministrationProgressCarryingouttheRequirementsofthe.pdf>



Alternative Fuel Vehicle Infrastructure Financing

The State of Maryland is interested in promoting alternative transportation fuels including natural gas, propane, ethanol fuel blends, and electricity. To this end, MEA issued a request for proposals in 2014 for contractors to conduct background research, evaluate key financial barriers, and evaluate and recommend financial mechanisms to overcome barriers to deployment of alternative fuel vehicle infrastructure. Work under this request is expected to be completed by December 19, 2014.⁸⁸

Utility Clean Energy Finance Programs

Pepco Small Business Energy Advance and BGE Small Business Energy Advance

Maryland's five largest electric utilities offer the EmPOWER incentive programs to help customers save energy and money. In the past year, BGE and Pepco added a finance component to the existing Small Business programs.

Pepco Small Business Energy Advance

Pepco's Small Business Energy Advance Program complements its Small Business Program, which offers qualifying customers incentives to install energy efficiency measures. The Small Business Energy Advance Program covers customer costs (after rebates have been paid) on projects larger than \$2,500. These costs are eligible to be repaid at zero percent interest through monthly installments on the customer's electric bill over 6, 12, or 24 months. Depending on the project costs and savings, cash flow benefits of this repayment schedule may be positive to the customer even within the repayment period.⁸⁹

Pepco's pilot effort began in November 2013 and will run until December 31, 2014. As of September 30, 2014, there were 264 customers and more than \$1 million in funds committed. Pepco has asked the Maryland Public Services Commission (PSC) to approve its continuing the pilot through 2015, with possible expansion in 2016.⁹⁰

SBEA - Pepco	
Years Active	
2013 to present (pilot)	
Eligible Participants	
Small businesses	
Target Technologies	
Energy efficiency	
Financing Products	
On-bill financing	
Status	
264 customers and over \$1 million in funds committed	

BGE Small Business Energy Advance

The BGE Small Business Energy Advance is similar to Pepco's program, with some minor differences. BGE's program is funded by \$2.5 million from the Exelon-Constellation Energy merger Customer Investment Fund. BGE launched its pilot in August 2014, and the program already is gaining traction

⁸⁸ "Announcements and bids. Requests for proposal (RFP): financing program design for alternative fuel vehicle refueling stations." (2014). Maryland Energy Administration. Accessed August 21, 2014: http://energy.maryland.gov/newmea/htdocs/Home/EnergyNews/Announcements_Bids.html

⁸⁹ "Small business energy advance." Pepco. Accessed September 20, 2014: <https://cienergyefficiency.pepco.com/SBAdvance.aspx>

⁹⁰ Ellis, W. R. (2014, September 30). Phone interview. (M. Tubman, Interviewer)

among eligible customers. BGE anticipates operating the pilot for two years, after which time the utility will seek PSC approval of a permanent continuation.⁹¹

Like Pepco's program, the BGE Small Business Energy Advance covers the 20 percent of project costs not paid for by the utility. BGE's program allows only a 12-month payback term, and most projects are cash-positive within that timeframe. Because the program includes fewer equipment options than does Pepco's program, there is only one page of customer paperwork involved, which means lower transaction costs.⁹²

Private-Sector Financing Programs

The private sector is also actively providing financing opportunities for clean energy projects. For example, companies offer rooftop solar systems to customers using financing mechanisms pioneered elsewhere in the country. Private companies also help companies and state agencies improve their energy efficiency through energy performance contracts.

SBEA - BGE
Years Active
2014 to present (pilot)
Eligible Participants
Small businesses
Target Technologies
Energy efficiency
Financing Products
On-bill financing
Status
Active

Solar Financing Programs

Demand for rooftop solar energy has inspired a number of private companies to offer financing products that help residential customers afford rooftop solar systems. Since the first rooftop solar installation in Maryland that registered with the grid operator in 1998, the number of rooftop solar systems has increased to 7,791, as of October 2014. It is unclear what percentage of these systems received financing. Of the systems, 7,342 are residential, with a total capacity of 52 megawatts, and 449 are commercial with 75 megawatts of capacity. When combined with nine utility-scale systems with 67 megawatts of capacity, there are a total 194 megawatts of capacity, exceeding the State's goal of 185 megawatts.⁹³

Solar financing
Years Active
1998
Eligible Participants
Residential and commercial
Target Technologies
Rooftop solar systems
Financing Products
Loans; leases

Solar leasing companies active in Maryland include NRG Energy, Solar City, Sungevity, Sunnova Energy, and SunPower.⁹⁴ Solar companies offer three types of lease products to residential customers, although the particular product offerings and details depend on the company.

The first option is a \$0-down payment lease or power purchase agreement, under which the homeowner either rents the system or pays a specified rate for the solar energy, which may escalate by

⁹¹ Jerome, J. (2014, October 3). Phone interview. (M. Tubman, Interviewer)

⁹² Jerome, J. (2014, October 3). Phone interview. (M. Tubman, Interviewer)

⁹³ Tomic, M. (2014, October 2). Phone interview. (M. Tubman, Interviewer)

⁹⁴ "Solar financing companies." EnergySage. Accessed September 20, 2014: <https://www.energysage.com/solar/financing/companies>



a given amount annually. In this model, the rebates, tax credits, and renewable energy credits available for solar systems accrue to the solar company, not the homeowner.⁹⁵

The second option is a lease or power purchase agreement with a down payment. With the down payment, companies may offer lower electricity rates or monthly payments. Annual electricity rate escalations may also be waived. As with the first option, the rebates, tax credits, and renewable energy credits available for rooftop solar systems accrue to the solar company, not the homeowner.⁹⁶

The third option is a prepaid lease or power purchase agreement. By making the entire payment upfront, the homeowner reaps some of the benefits of outright ownership, although the solar company retains ownership of the system and is responsible for its maintenance. Discounts may be offered on the total cost of the lease, and the solar company may share some of the benefits of sales of renewable energy credits originating from the homeowner's system.⁹⁷

Despite the successes of private solar financing, these financing products are not able to reach all corners of the market.

Maryland has encouraged these commercial agreements by offering grants to lower residential customers' net costs. As the price of solar systems has decreased in recent years, Maryland has reduced its incentives. The State currently offers a \$1000 incentive for purchased systems, but it stopped offering incentives for leased systems in November 2013.⁹⁸

Despite the successes, these products are not able to reach all corners of the market. The most attractive projects for private companies to finance are those with the lowest risk and cost factors, such as new buildings, large roof surface areas, good credit scores, and the ability to commit to a long-term lease. Potential customers with higher risk and higher costs may not have access to the market.⁹⁹ In response, the State is examining some options to address access to renewable energy for low- to moderate-income individuals as highlighted earlier in this section.

Energy Performance Contracting Offerings

An energy performance contract is an agreement entered into by a customer and an ESCO under which the ESCO develops, arranges financing for, and installs energy efficiency projects with guaranteed energy and costs savings. Energy cost savings resulting from these projects are used to pay the ESCO for its services. Energy performance contracts can be used for private-sector projects but are more

⁹⁵ "Types of solar leases and PPAs: \$0-down, prepaid, and custom down payment." EnergySage. Accessed September 20, 2014: <https://www.energysage.com/solar/financing/types-of-solar-leases-and-ppas>

⁹⁶ "Types of solar leases and PPAs: \$0-down, prepaid, and custom down payment." EnergySage. Accessed September 20, 2014: <https://www.energysage.com/solar/financing/types-of-solar-leases-and-ppas>

⁹⁷ "Types of solar leases and PPAs: \$0-down, prepaid, and custom down payment." EnergySage. Accessed September 20, 2014: <https://www.energysage.com/solar/financing/types-of-solar-leases-and-ppas>

⁹⁸ Tomic, M. (2014, October 2). Phone interview. (M. Tubman, Interviewer)

⁹⁹ Tomic, M. (2014, October 2). Phone interview. (M. Tubman, Interviewer)

commonly used for municipal, state, university, school, hospitals, and similar public projects. Because these projects can be time-consuming to develop, they can be daunting for entities with no prior experience. Experience also plays a crucial role in whether an entity has good success with performance contracting. As a result, State programs often make experienced staff available to other entities to help them through the process.¹⁰⁰ Some states have established self-funding programs that charge a small fee to cover the cost of providing this expertise. The fee is included in the project cost and is covered by the energy savings.

Both programs that follow are managed by state agencies. We have included the programs in this private-sector section because private lenders or investors typically provide the project financing, either directly or through the sale of bonds. One potential role for a green bank would be to serve as a central bonding authority to aggregate projects and issue bonds. This could potentially serve to reduce transaction costs and interest rates.

Energy Performance Contracting Program

The Energy Performance Contracting Program is an ongoing Department of General Services (DGS) program to provide energy performance contracts to state agencies to reduce state government energy consumption.

Under this program, DGS uses an indefinite delivery contract to facilitate the creation of contracts between seven ESCOs and state agencies, thereby avoiding the necessity of separate requests for proposal for individual projects.¹⁰¹ DGS manages the contract as well as the installation of energy efficiency improvements by the ESCO. Local governments can also use DGS contracting assistance if their procurement processes are aligned with state government processes.¹⁰²

DGC has approved 21 energy performance contract projects since 2007. These projects are guaranteed to realize energy and operational savings of \$21.3 million annually and \$310 million total over the lives of the contracts.¹⁰³

Energy Performance Contracting
Years Active
2007 to present
Eligible Participants
State and local agencies
Target Technologies
Energy efficiency
Financing Products
Energy performance contracts
Status
21 projects; \$21.3 million in annual energy savings; \$310 million in lifetime energy savings

Energy Performance Contracting Assistance Program (EPCAP)

The Energy Performance Contracting Assistance Program is a new effort by the MEA to assist public housing authorities and local governments in entering into energy performance contracts with energy service companies.¹⁰⁴

¹⁰⁰ Bresette, D., and St. Jean, D. (2014, October 1). Phone interview. (M. Tubman, Interviewer)

¹⁰¹ "Energy performance contracting assistance program." Maryland Energy Administration. Accessed September 21, 2014: <http://energy.maryland.gov/Education/EnergyPerformanceContractingAssistanceProgram.htm>

¹⁰² Bresette, D., and St. Jean, D. (2014, October 1). Phone interview. (M. Tubman, Interviewer)

¹⁰³ "Energy conservation." Maryland Department of General Services. Accessed October 1, 2014: <http://www.dgs.maryland.gov/Energy/Performance/index.html>



Under this program, MEA will take on the role of owner’s agent for at least six local governments and four public housing agencies. MEA and contracted partners will help solicit bids for and enter into energy performance contracts with energy service companies to make energy efficiency improvements to public housing facilities including heating, cooling, ventilation, building envelope upgrade, lighting re-designs, and advanced controls.¹⁰⁵

The program was launched in February 2014 and began reaching out to potential participants in April 2014.¹⁰⁶ The program was intended to target public housing authorities by aggregating projects. A number of communities have expressed interest in participating and have had walkthrough audits to determine the size of opportunities. To date, MEA is working with one local government and two public housing authorities on energy audits, background information, and financial analysis. However, energy performance contracts are time-intensive to establish and those involving public housing authorities must also comply with strict regulations from the U.S. Department of Housing and Urban Development. Because the program is in its early stages, no contracts have yet been signed and none are expected during 2014.¹⁰⁷

EPCAP
Years Active
2014 to present (pilot)
Eligible Participants
Local agencies and housing authorities
Target Technologies
Energy efficiency
Financing Products
Energy performance contracts
Status
No contracts are yet finalized

Future Maryland Financing Opportunities

While most of the existing public financing activities target energy efficiency improvements and some encourage renewable energy installations, the state government has identified other areas of opportunity, particularly microgrids, combined heat and power operations, and commercial and residential renewable energy installations.

Summary

Table 3 summarizes Maryland’s current and planned financing programs.

¹⁰⁴ “Energy performance contracting assistance program.” Maryland Energy Administration. Accessed September 21, 2014: <http://energy.maryland.gov/Education/EnergyPerformanceContractingAssistanceProgram.htm>

¹⁰⁵ “Energy performance contracting assistance program.” Maryland Energy Administration. Accessed September 21, 2014: <http://energy.maryland.gov/Education/EnergyPerformanceContractingAssistanceProgram.htm>

¹⁰⁶ “Energy performance contracting assistance program.” Maryland Energy Administration. Accessed September 21, 2014: <http://energy.maryland.gov/Education/EnergyPerformanceContractingAssistanceProgram.htm>

¹⁰⁷ Bresette, D. (2014, September 22). Phone interview. (M. Tubman, Interviewer)

Table 3: Summary of Clean Energy Financing Programs in Maryland

Sponsor – Program	Years Active	Eligible Participants	Target Technologies	Financing Products	Status
Public Clean Energy Finance Programs					
DHCD – Be Smart Home Program	2010 to present	Residential property owners	Energy efficiency	Loans	89 projects; \$1.3 million in loans
DHCD – Be Smart Multifamily	2010 to present	Multifamily property owners	Energy efficiency; renewable energy	Loans; loan loss reserves	10 projects; \$12.086 million in loans and loan loss reserves
DHCD – Be Smart Business	2010 to 2012	Commercial property owners	Energy efficiency	Loans	5 projects; \$737,429 in loans
MEA – Jane E. Lawton Conservation Loan	2008 to present (consolidated from existing programs)	Nonprofits, local governments, businesses, and other entities	Energy efficiency	Loans	18 projects; \$5.2 million in loans (since program consolidation)
MCEC – Maryland Clean Energy Capital (MCAP)	2008 to present	Nonprofits, municipal governments, universities, schools, hospitals	Energy efficiency	Tax-exempt bonds	3 projects; \$15 million in bonds
MCEC & MEA – Maryland Home Energy Loan Program (MHELP)	2009 to present	Residential property owners	Energy efficiency	Loans	1,900 projects; \$18 million in loans
MEA – State Agency Loan Program (SALP)	1991 to present	State government agencies	Energy efficiency	No-interest loans with administrative fee	55 projects; \$24+ million in loans (since 1998)
DHCD – Multifamily Portfolio Energy Retrofit Customer Investment Fund (CIF) Program	2012 to present	Multifamily property owners	Energy efficiency; renewable energy	Loans	1 project; \$890,000 in loans
Public Clean Energy Grant Programs					
MEA – Maryland Smart Energy Communities	2013 to present	Local governments	Energy efficiency; renewable energy	Grants	\$4 million available in total funding
Emerging Public Finance Opportunities and Programs					
Local Governments – PACE programs	2014 state authorization for local government programs	Commercial property owners	Energy efficiency; renewable energy	Repaid through an assessment on the property tax bill	No local programs operational yet



Sponsor – Program	Years Active	Eligible Participants	Target Technologies	Financing Products	Status
MEA – Regulated Sustainable Energy Contract Program	2013 state authorization	Residential property owners	Energy efficiency; renewable energy	Contracts are billable directly to property owners	Pilot projects are not yet implemented
AFV Infrastructure Financing	2014 RFP for initial program research	Undetermined	Alternative fuel vehicles	Undetermined	Initial RFP work is to be concluded in 2014
Utility Clean Energy Finance Programs					
Pepco & BGE – Small Business Energy Advance	Pepco: 2013 to present (pilot) BGE: 2014 to present (pilot)	Small businesses	Energy efficiency	On-bill financing	Pepco: 264 customers and over \$1 million in funds committed
Private-Sector Financing Programs					
Solar Firms – Solar financing	1998 (first residential system installed)	Residential and commercial property owners	Rooftop solar systems	Loans; leases	Unknown
DGS – Energy Performance Contracting Program	2007 to present	State government agencies and local governments with aligned procurement processes	Energy efficiency	Energy performance contracts	21 projects \$21.3 million in annual energy savings; \$310 million in lifetime energy savings
MEA – Energy Performance Contracting Assistance Program	2014 to present (pilot)	Local governments and public housing authorities	Energy efficiency	Energy performance contracts	No contracts are yet finalized

Table 4 shows program results in terms of the number of projects and the total amount financed to date. However, the total amounts financed are not easily compared between programs because some programs have operated much longer than others. Figure 2 adjusts for this disparity by dividing the total amount each program has financed by the number of years the program has been in operation. Figure 3 presents the same information grouped by market sector.

Table 4. Maryland's Clean Energy Financing Programs by Market Sector, Type, and Results

Program Name	Market Sector						EE / RE		Type				Results	
	Residential	Multifamily	Small Business	Commercial / Industrial	MUSH ¹	Nonprofit	Energy Efficiency	Renewable Energy	Credit Enhancement	On-Bill Repayment	Lease	PACE	Number of Projects	Dollar Amount Funded
Public Clean Energy Financing Programs														
Be Smart Home Program	R						EE						89	\$ 1,300,000
Be Smart Multifamily		MF					EE	RE	CE				10	\$ 12,100,000
Be Smart Business			SB	C			EE						5	\$ 700,000
MD Home Energy Loan Program (MHELP)	R						EE						1,900	\$ 18,000,00
Jane E. Lawton Conservation Loans		MF	SB	C/I	M	NP	EE						18	\$ 5,200,000
Maryland Clean Energy Capital (MCAP)					M	NP	EE						3	\$ 15,000,000
State Agency Loan Program					M		EE						55	\$ 24,000,000
Multifamily Customer Investment Fund (CIF)		MF					EE	RE					1	\$ 900,000
Emerging Public Finance Opportunities and Programs														
PACE programs		MF	SB	C/I			EE	RE				P	In development	
Regulated Sustainable Energy Contract Program	R						EE	RE					Pilots in development	
Alternative Fuel Vehicle Infrastructure Financing													RFP in development	
Other sector financing							EE						Studies complete	
Maryland Smart Energy Communities					M		EE	RE					\$4 million available	
Private-Sector Financing Programs														
Small Business Energy Advance			SB				EE			OB			264	\$ 1,000,000
Solar financing	R	MF	SB	C/I				RE			L		Not determined	
Energy Performance Contracting Program					M		EE						21	NA
Energy Performance Contracting Assistance		MF			M		EE						In development	

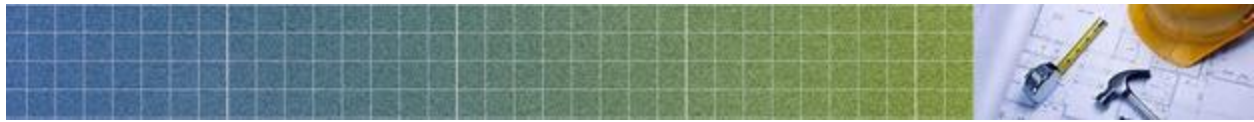


Figure 2. Average Annual Financing Program Volumes in Maryland

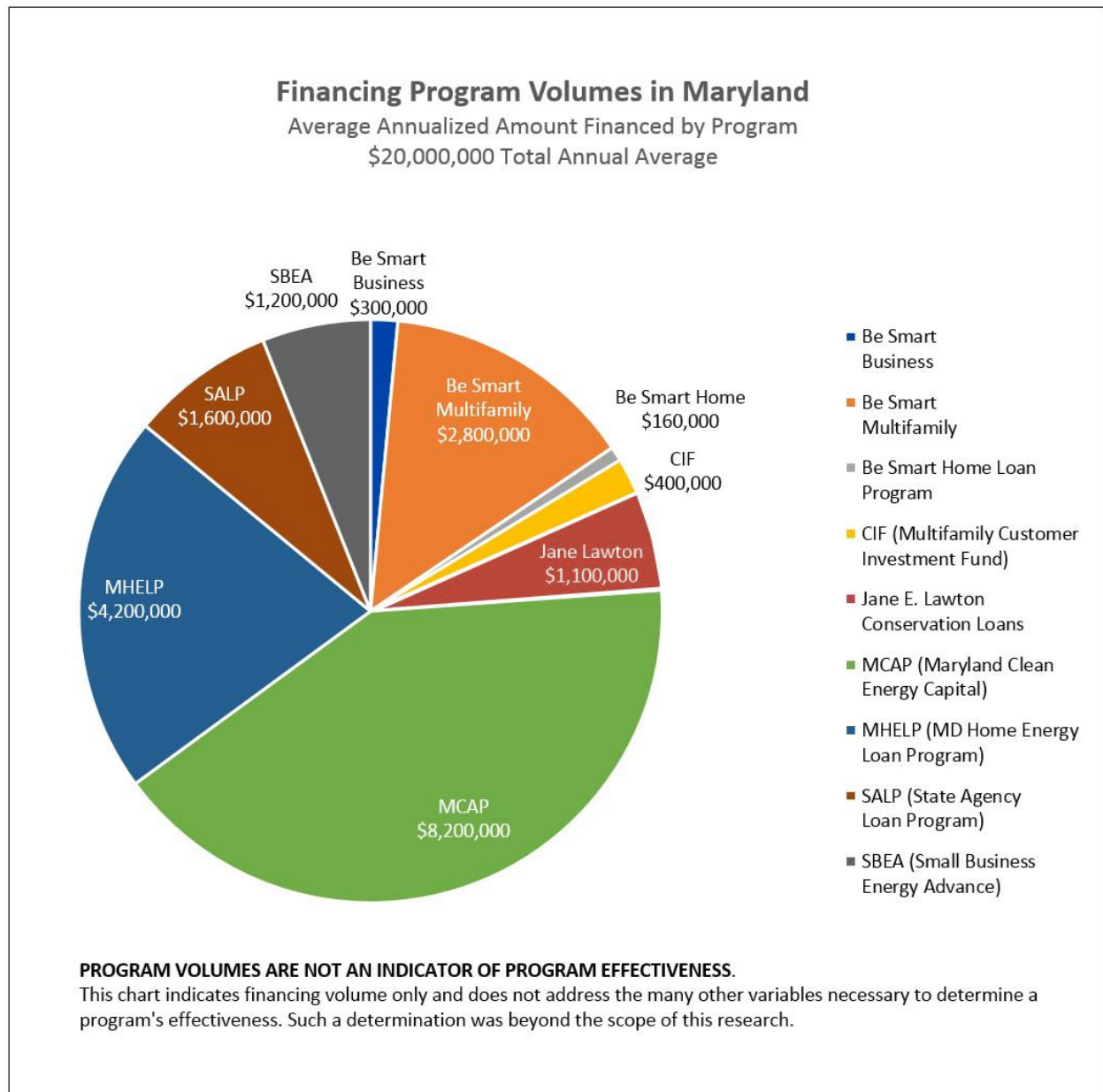
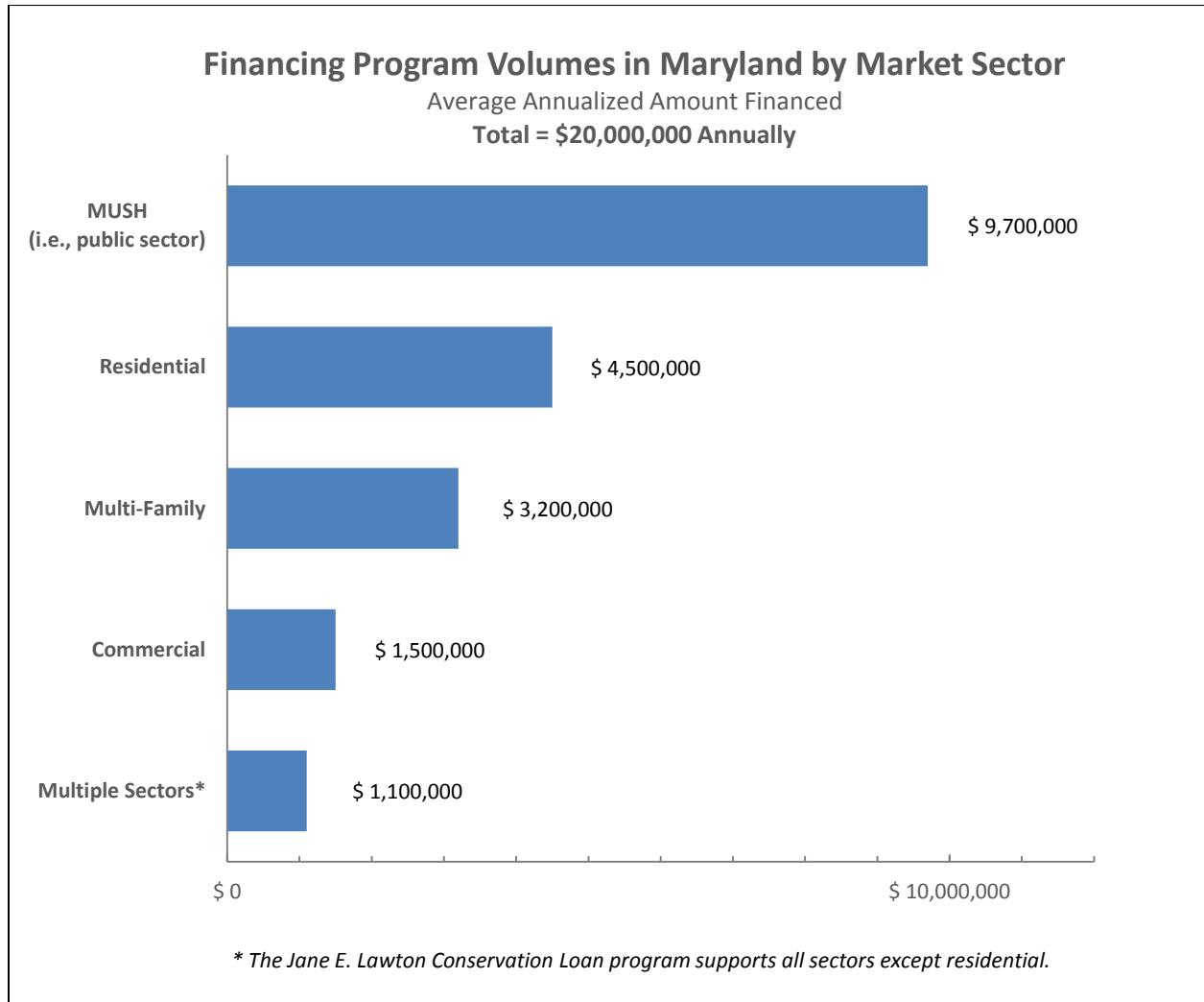


Figure 3: Financing Program Average Annual Volumes by Sector





5. Market Assessment – Identification of Barriers and Financing Gaps

In order to understand a green bank's potential role, it is critical to identify barriers and financing gaps in markets where the private sector is not currently providing clean energy financing solutions. To better understand these market barriers, MCEC conducted online surveys and facilitated discussions with key Maryland stakeholder groups. The survey, while not statistically representative, was designed to provide key insights into stakeholder perspectives and concerns around financing overall, as were the stakeholder meetings. MCEC and the Cadmus team used the results from these efforts to identify barriers and financing gaps affecting clean energy financing in Maryland.

Section Summary

- Maryland has significant untapped renewable energy and energy efficiency potential, including an estimated \$5.7 billion in renewable energy investment related to the State's Renewable Portfolio Standard and an additional \$2.6 billion in cost-effective efficiency savings.
- MCEC distributed six online surveys and convened six facilitated discussions with key Maryland stakeholder groups: financial institutions, contractors, utilities, municipalities, consumer advocacy groups, and entrepreneurs / business leaders.
- Stakeholders identified both financing and non-financing gaps in Maryland.
- Non-financing gaps identified by stakeholders include education and awareness, capacity building, technical assistance, coordination, and standardization.
- Financing gaps identified by stakeholders include financing for small commercial / small business, low- to moderate-income residential, small municipal and emerging technologies.

Market Potential Size

A 2008 analysis by the American Council for an Energy-Efficient Economy (ACEEE) identified more than 22,000 GWh of cumulative cost-effective electricity efficiency opportunity in Maryland through 2025, corresponding to \$2.6 billion in customer electricity bill savings and 12,241 new jobs.¹⁰⁸

On the clean power side, in 2013 Maryland had a total of 986 MW of installed renewable energy capacity, providing 7% of Maryland's 2013 electricity generation from renewable sources. This figure

¹⁰⁸ "Energy efficiency: The first fuel for a clean energy future; resources for meeting Maryland's electricity needs." (2008). American Council for an Energy-Efficient Economy. Accessed November 7, 2014: <http://www.aceee.org/research-report/e082>

falls short of the 20% that Maryland’s Renewable Portfolio Standard calls for by 2022.¹⁰⁹ Achieving the RPS is projected to require an additional \$5.7 billion in investment between 2015 and 2020.¹¹⁰

In August 2014, Maryland and the U.S. Bureau of Ocean Energy Management auctioned off leasing rights for nearly 80,000 offshore acres in the Maryland Wind Energy Area. This area alone could support between 850 and 1450 MW of wind generation if fully developed, or enough electricity to power approximately 300,000 homes.¹¹¹

Market Needs Assessment Approach

Every clean energy project involves a variety of stakeholders, each of whom brings a unique viewpoint. To capture these viewpoints and facilitate the assessment of financing gaps, MCEC identified several key stakeholder groups to participate in a market needs assessment. These stakeholder groups included:

- **Financial institutions:** Lenders (banks, credit unions) and associations representing lenders.
- **Contractors:** Energy Service Companies (ESCOs), residential and commercial EE/RE installers, manufacturers, and equipment vendors.
- **Utilities:** Representatives from utilities that operate in Maryland.
- **Municipalities:** Local government, university, and state entity representatives.
- **Consumer advocacy groups:** Nonprofits, city-level sustainability representatives and public interest groups.
- **Entrepreneurs / business leaders:** Incubator companies, start-up firms, and energy consultants.

Members of each stakeholder group were asked to participate in a survey and to attend one of a series of facilitated stakeholder meetings aimed at identifying current market barriers and financing gaps for renewable energy and energy efficiency financing in Maryland.

Surveys

Using the online survey tool Qualtrics, Cadmus asked participants about the state of energy efficiency and renewable energy financing in Maryland, and where they saw opportunities to improve existing practices or add new options. Customized surveys asked specific questions relevant to each stakeholder group. The surveys were designed to gather qualitative input from various stakeholder groups. Each survey asked about financing gaps in Maryland, current clean energy financing or lending practices, and market segments with the most demand for financing. Example survey questions include:

¹⁰⁹ “Renewable energy in the 50 states: northeastern region.” (2014). American Council on Renewable Energy.

Accessed November 7, 2014: <http://www.acore.org/files/pdfs/states/Maryland.pdf>

¹¹⁰ “Refined Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan—Appendices C through E.” (2013). Page 27. Regional Economic Studies Institute, Towson University. Accessed November 26, 2014: http://climatechange.maryland.gov/site/assets/files/1392/appendix_e-2_-_economic_impact_analysis_c_through_e_final.pdf

¹¹¹ “Maryland activities.” (2014). U.S. Bureau of Ocean Energy Management. Accessed November 7, 2014: <http://www.boem.gov/Maryland/>



- Do you view the lack of financing as a barrier to further energy efficiency/renewable energy implementation in Maryland?
- In which sectors, if any, is the marketplace meeting clean energy financing needs?
- Which sectors would benefit most from better access to capital for energy efficiency or renewable energy?
- What financing solutions do you think would make it easier to implement energy efficiency or renewable energy projects in Maryland?

Table 5 shows the total number of completed and distributed surveys.

Table 5: Total Completed Surveys by Group

Survey Groups	Completed Surveys
Financial institutions	5 of 12
Contractors	11 of 23
Utilities	3 of 7
Municipalities	3 of 23
Consumer advocacy groups	6 of 21
Entrepreneurs/business leaders	9 of 28

Following the survey's completion, MCEC and Cadmus analyzed the results, examining both closed- and open-ended questions to formulate findings and conclusions. These results were also used to help provide context for the facilitated stakeholder meetings that followed.

Facilitated Stakeholder Meetings

MCEC convened a series of facilitated meetings with members of these same stakeholder groups. The stakeholder meetings occurred over several days. Representatives from Cadmus and Catalyst Financial facilitated the groups, which MCEC and MEA also attended. These discussions were designed to expand on some of the areas covered by the survey, and to identify potential (perceived) barriers/gaps related to clean energy financing in Maryland. Example questions asked during the facilitated meetings include:

- Where are clean energy financing options meeting needs and where are the gaps?
- What kinds of projects/technologies are difficult to finance?
- How have you been funding projects? What is working?
- What could a green bank do to meet gaps in financing?

Table 6 shows the total number of attendees by stakeholder group.

Table 6: Stakeholder Meeting Attendance

Stakeholder Group	Attendees
Financial institutions	8
Contractors	6
Utilities	5
Municipalities	8
Consumer advocacy groups	6
Entrepreneurs/business leaders	9

Meeting facilitators took notes and made audio recordings of each meeting for future analysis.

Findings by Stakeholder Group

Using the results of the stakeholder surveys and the facilitated stakeholder meetings, MCEC and Cadmus identified several barriers and financing gaps for each stakeholder group, as described below.

Financial Institutions

- **Small commercial project funding gaps.** The majority of the financial institutions that participated in the stakeholder input process stated that they were currently providing renewable energy and energy efficiency loans for commercial projects. However, the minimum funding amount (deal size) in which lenders were interested was noted as being too large for many small commercial projects. One participant stated that their institution does not lend sums less than \$100,000. Others noted that smaller projects are harder to finance without some form of aggregation. Mariner Finance, working in conjunction with MCEC, offers loans through the MHELP program for up to \$20,000, but only for residential customers.
- **Structural and institutional barriers.** Financial institutions stated that institutional barriers exist; one cited a decision by the Federal Housing and Finance Authority to prohibit Fannie Mae and Freddie Mac from accepting mortgages on homes with PACE liens. While this did not impact commercial PACE, it effectively put an end to residential PACE. The group also noted that while small business loans often receive a guarantee from the Small Business Administration, these loans may still need additional security or personal guarantees to attract lender interest.
- **Lack of capacity and/or technical knowledge among market participants.** After expressing interest in Maryland's having a green bank, several financial institutions stated that communities, particularly smaller ones, would likely rely heavily on the green bank for the technical support required to develop and manage projects. Should Maryland move forward with a green bank, it would be important for its offerings to include technical assistance to communities developing projects and training for long-term project management.



- **Technology risk.** Promising technologies that have yet to gain mainstream acceptance and/or reach scale (e.g., biomass, micro grid) can be hard to finance because they do not have a long financial performance history. Sometimes these technologies have proven histories in other countries, but U.S. lenders still prefer performance data from U.S. examples.

Contractors

- **Customer debt constraints. Need for off-balance-sheet options.** Contractors noted that many customers, especially in the MUSH market,¹¹² are unable or unwilling to take on additional debt to finance projects due to borrowing capacity limitations. Most, they stated, would prefer an off-balance-sheet financing option such as MCEC's MCAP, PACE, on-bill repayment, or leasing.¹¹³
- **Small commercial project funding gaps.** Participants identified that commercial projects have trouble finding financing in the range of \$5,000 to \$2 million. Most identified the greatest financing gap to be for commercial loans from \$50,000 to \$1 million. Contractors also stated that they believed the small commercial market to have the most latent demand. Seven of the 11 contractors who completed the survey identified this sector as the one that would benefit the most from a greater access to capital. Contractors also indicated that residential scale projects implemented for small businesses (projects in the \$10,000 to \$20,000 range) are difficult to finance.
- **Split incentives.** In leasing arrangements, property owners often pass on energy costs to the tenants, so the owners have little incentive to make facility improvements, a condition known as "split incentives." Many small commercial customers rent their place of business and are affected by split incentives, which increase the challenge of making energy efficiency improvements for this group.
- **Residential low- and moderate-income funding gaps.** Residential contractors identified low- and moderate-income homeowners as those with the greatest financing needs. These homeowners do not qualify for low-income weatherization programs because their income exceeds the maximum threshold for participation and they do not have sufficient income to qualify for traditional financing options. Contractors also expressed concern over the financing gap that would be created if the existing MHELP loan program were to end.
- **Lack of education and awareness.** Contractors agreed that customers are, for the most part, not aware of existing clean energy finance programs or are unfamiliar or uncomfortable with the concept of financing improvements. Education is critical to implementation success and it will take a focused effort to overcome this barrier.

¹¹² MUSH stands for Municipalities, Universities, Schools and Hospitals.

¹¹³ Certain lease structures may be considered off balance sheet. The off-balance-sheet treatment of PACE and on-bill repayment varies by program and jurisdiction.

- **Payback expectations.** Contractors mentioned that commercial customers look for projects with a rapid payback. Many will not undertake an energy efficiency or clean energy project that takes more than three years to recoup its costs.
- **Interest rates.** Interest rates need to be very competitive to ensure that customers can see immediate savings from energy reductions that exceed the cost of financing. Projects that simply “break even” (e.g. have energy savings equal to financing costs) may not motivate the borrower.

Utilities

- **Need for a “one stop shop.”** The ability to coordinate the financing efforts with a group that is familiar with all the state and local lender programs would help move the market.
- **Concerns about the added regulatory, accounting, and financial burdens of offering financing.** Setting up and running an on-bill finance program creates costs that a utility would need to absorb. In spite of the fact that some offer limited lending to small businesses, utilities are wary about being in the position of becoming lenders. Some utilities also noted that they lacked the necessary infrastructure to offer financing programs.
- **Avoiding perceived costs to the energy user.** The perception that no new “taxes” or tariffs are being added to the bill is important.
- **Underserved markets.** Utilities see a financing need for residential renewable energy financing, small business, and nonprofit markets. They also see a need to help finance infrastructure (getting natural gas to more remote areas to promote industrial development and for residential use).
- **Capacity barriers.** Similar to financial institutions, utility representatives stated that once the finance barrier is removed, customers still will need technical support.
- **On bill financing/recovery.** Certain constituencies seem to find on-bill finance (OBF) and on-bill recovery (OBR) to be effective financing models (BG&E Small Business Energy Advance program was mentioned).

Consumer Advocacy Groups

- **Lack of customer education and trust. Need for statewide coordination.** Consumer groups stated that customer trust is a critical component to any financing program’s success, particularly with low- to moderate-income customers. One participant identified what he called a “credibility barrier.” Others noted that many low- to moderate-income customers did not trust large financial institutions. Proper education and awareness regarding energy efficiency and its upfront costs (as well as financing options) are also important to increasing market adoption. Consumer groups stated that some customers don’t always anticipate the magnitude of upfront costs and think upgrades should be cheaper, not necessarily understanding the payback and savings gained from increased efficiency. Finally, multiple group members commented on the need to coordinate existing programs and build awareness around what is already available and



what new programs are being developed. They noted a need for common messaging and coordinated marketing.

- **Residential low- and moderate-income funding gaps.** The consumer group stated that the low- to moderate-income sector (those customers who don't qualify for weatherization) need financing support. One stakeholder noted that the greatest barriers for energy efficiency and clean energy involve transactions between \$5,000 and \$25,000.
- **Split incentives.** Consumer groups stated that split incentives, particularly in the nonprofit and small commercial market, present a barrier to implementing energy efficiency or renewable energy. This split incentive, where the customer does not own the building space in which his or her firm is located, makes it difficult for the owner to justify paying for improvements if the tenant pays the utilities and would be the one to realize the savings. Conversely, tenants are usually reluctant to pay for energy improvements because they don't own the building or may be thinking about moving.
- **Technology risk.** The consumer group noted that while some technologies, such as residential solar PV, are relatively easy to finance, other technologies that have not yet reached similar scale, such as solar thermal for water heating, can be hard to finance. Several group participants mentioned that customers have more difficulty financing energy efficiency upgrades than they do with solar PV where the private market is relatively robust.

Government/Municipal

- **Debt constraints. Need for off-balance-sheet options.** Respondents indicated that they struggle with financing because of their debt capacity and inability or unwillingness to take on further public debt which may adversely affect their cost of borrowing for other projects. Multiple participants suggested that additional off-balance-sheet financing options would help to address this concern.
- **Institutional and structural disincentives due to handling of utility budgets.** Several respondents expressed concern that their budgets would shrink as their utility bills decreased (i.e., the energy savings would be removed from the next year's budget). How to address this concern will be an important hurdle for Maryland's designated financial institution (green bank or other) to address if it is to provide services to municipalities and local governments.
- **Contract risk.** Stakeholder meeting participants expressed a need for standardized contracts, specifically Power Purchase Agreements (PPAs).
- **Market needs beyond traditional energy efficiency and renewable energy.** Stakeholders expressed that a green bank should have sufficient flexibility to finance a broad array of projects, like water

Water pumping and distribution consume significant amounts of energy. In California, water conservation improvements are eligible for PACE funding. This sort of flexibility is important for a green bank.

treatment and environmental quality, that directly or indirectly impact energy efficiency and renewable energy goals.

- **Lack of funding for smaller municipal projects.** Municipality and local government representatives identified projects with funding needs of less than \$1 million as being the most difficult to finance. Specifically, participants variously mentioned projects in the range of \$250,000 to \$1 million, less than \$500,000, and \$50,000 to \$150,000 as being difficult to finance.
- **Lack of technical capacity.** As financial institutions and utility representatives also noted, technical capacity is a critical component to helping municipalities conduct their due diligence and implement financing projects. Many government stakeholders felt constrained by limited time and staff to dedicate to moving projects forward.

Entrepreneurs/Business Leaders

- **Lack of customer education and awareness.** As other groups have identified, entrepreneurs and business leaders stated that customer education and awareness are barriers to clean energy adoption and finance. Several stated that lenders or investors often lack knowledge or information specifically related to energy efficiency or renewable energy technologies and their performance histories.
- **Contract risk.** While PPAs are effective, they are complicated, expensive, and often intimidating to the smaller borrowers. Having a common template PPA could help. Stakeholder group members mentioned that PPAs lacked standardization or that State-required contract language was too rigid.
- **Gaps in financing amounts available.** While this group did not arrive at a consensus on the deal size for which the financing gap exists (numbers ranged from \$50,000 to \$10 million), many did acknowledge that a gap exists, suggesting the need for further examination.
- **Need for a “one stop shop.”** Having a single point of contact that can help with the variety of incentives, financing programs, and technical assistance is needed.
- **Purchase order financing.** For small contractors, it can be difficult to buy the equipment at the beginning of a project when they won’t be paid until the end of the project. Cash flow financing could help with this situation. Entrepreneurs expressed a similar need for purchase order financing for clean energy startups and early stage businesses in order to move new energy technologies to market faster.

Table 7 summarizes these issues raised by stakeholders.



Table 7. Summary of Issues by Stakeholder Group

Financial institutions

- Small commercial project funding gaps.
- Structural and institutional barriers.
- Lack of capacity and/or technical knowledge among market participants.
- Technology risk.

Contractors

- Customer debt constraints. Need for off-balance-sheet options.
- Small commercial project funding gaps.
- Split incentives.
- Residential low- and moderate-income funding gaps.
- Lack of education and awareness.
- Hurdle rates.
- Interest rates.

Utilities

- Underserved markets.
- Capacity barriers.
- On bill financing/recovery.
- Avoiding increasing costs to the energy user.
- Need for a “one stop shop.”
- Concerns about the added regulatory, accounting, and financial burdens of offering financing.

Consumer advocacy groups

- Lack of customer education and trust. Need for statewide coordination.
- Residential low- and moderate-income funding gaps.
- Split incentives.
- Technology risk.

Government/municipal

- Debt constraints. Need for off-balance-sheet options.
- Institutional and structural disincentives due to handling of utility budgets.
- Contract risk.
- Lack of funding for smaller municipal projects.
- Lack of technical capacity.

Entrepreneurs/business leaders

- Lack of customer education and awareness.
- Contract risk.
- Gaps in financing amounts available.
- Need for a “one stop shop.”

Analysis of Cross-cutting Barriers and Gaps

While analyzing feedback across the different stakeholder groups, MCEC and the Cadmus team identified several reoccurring financing barriers and gaps. These barriers and gaps fell into two categories:

- Non-financial barriers affecting market penetration and uptake.
- Financing gaps for specific sectors, technologies, or project sizes.

Non-financial Barriers

A reoccurring theme across all stakeholder feedback was that non-financial barriers, such as the lack of technical expertise, shortage of project management staff for large projects, customer education, and awareness of financing options were preventing increased adoption of clean energy in the State of Maryland.

Education and Awareness

Multiple groups stated that customer education and awareness is a critical barrier to clean energy adoption and financing. Maryland utilities and agencies offer a wide variety of energy efficiency programs as well as several financing offerings, but multiple stakeholder groups expressed frustration at the lack of unified messaging around these programs. A green bank could help existing programs to provide unified messaging, build awareness, and prevent confusion in the marketplace. Second, there appears to be a strong need for customer, contractor, and financial institution education about clean energy technologies, associated risk, and financing options. This education needs to be presented in a way that bridges the current “credibility gap” and facilitates project implementation.

Coordination

In addition to the education and awareness, stakeholder groups expressed the need for coordination and consistency across the state on financial programs and incentive offerings. Current financing options may be duplicative or may differ from one area of the state to another creating confusion for the consumer. Effective coordination of offerings by a green bank would help both participants and financiers better understand the marketplace. Multiple stakeholder groups also forwarded the idea of a “one-stop shop” or a single point of contact that could coordinate energy efficiency and renewable energy financing for all sectors and technologies.

Capacity Building and Technical Assistance

Many groups stated that a lack of technical expertise and capacity presents a significant barrier to development of a green bank. Small communities as well as customers with limited knowledge and time (such as small businesses and residential customers) need information and project-level technical expertise from a green bank or similar entity to assist with various steps of project implementation.



Standardization

Entrepreneurs and municipal representatives stated that the variation among financial contracts, specifically PPAs, generates additional risk and increases the complexity of implementing a successful project, thus reducing potential for investment. The opportunity to develop standardized template documents and build consensus around a common standard for different financial vehicles could increase market adoption of clean energy.

Financing Gaps

Stakeholders identified financing gaps for three market sectors—MUSH (municipalities, universities, schools, and hospitals), residential, and commercial—and for emerging technologies in general. Figure 4 summarizes these gaps.

Figure 4: Financing Gaps Identified by Stakeholders

Market Sector	Gaps
MUSH (i.e., public sector)	<ul style="list-style-type: none"> • Smaller projects under \$1 million • More off-balance sheet financing, such as MCAP, PACE, on-bill, and leases
Residential	<ul style="list-style-type: none"> • Low- and moderate-income families • Renewable energy projects
Commercial	<ul style="list-style-type: none"> • Smaller projects under \$1-2 million • Financing that solves the split incentive problem, such as PACE and on-bill
Emerging Technologies	<ul style="list-style-type: none"> • Financing for technologies besides solar PV

Figure 4 shows that gaps were identified even in the MUSH sector, which is the sector receiving the most program financing. This is likely because all program volumes are still relatively small compared to the multi-billion dollar potential for viable investment in energy efficiency.¹¹⁴

These stakeholder-identified gaps are consistent with what Cadmus has seen in other states. Although stakeholders did not mention gaps in the multi-family sector, they did not say that there are no gaps.

¹¹⁴ “Energy efficiency: The first fuel for a clean energy future; resources for meeting Maryland's electricity needs.” (2008). American Council for an Energy-Efficient Economy. Accessed November 7, 2014: <http://www.aceee.org/research-report/e082>

Multi-family projects are subject to the same tenant-landlord split-incentive problems that stakeholders identified for the commercial sector, and are subject to the same financing solutions.

Brief summaries of the specific financing gaps follow.

Small Commercial Projects

Many groups identified small commercial as the sector with the largest potential for clean energy and energy efficiency projects, as well as the largest need for financing. Stakeholders identified the lack of financing for smaller to mid-size projects (\$5,000 - \$2 million) as a significant gap in both energy efficiency and renewable energy financing. Split incentives are a barrier to be addressed.

Small Municipal Projects

Stakeholders identified the lack of financing for small municipal projects (likely \$50,000 to \$1 million) as a significant gap for both energy efficiency and renewable energy financing. Off-balance-sheet financing options facilitated by a green bank entity could address this gap.

Moderate Income Residential

Stakeholders identified a gap in moderate income residential for both energy efficiency and renewable energy between those who qualify for low-income weatherization assistance and those that who can qualify for an existing program such as MHELP. A green bank could be instrumental in developing financing options to address this market segment.

Emerging Technologies

Through the course of the conversations, several technologies emerged as potential candidates for green bank financing, including waste-to-energy, solar thermal, geothermal, and combined heat and power (CHP). Each is a proven technology, but lacks the market awareness and lender confidence of more mainstream technologies such as solar PV, which appears to have the most advanced private-sector lending support. However, even more mainstream clean energy solutions like solar PV and weatherization could use green bank support in certain markets or at certain deal sizes.



CONCLUSIONS

Conclusions

- **Maryland has significant unmet energy efficiency and renewable energy investment needs –** Between now and 2022, Maryland will need \$5.7 billion in renewable energy investment to reach its Renewable Portfolio Standard (RPS) goal. Maryland also has at least \$2.6 billion in additional energy efficiency savings opportunities. Maryland will need to leverage private-sector capital in order to meet these needs.
- **Maryland's existing financing efforts lack coordination** - Maryland has a large number of existing finance programs, each of which was developed to address the needs of a specific constituency or to use a particular funding source (ARRA monies, Exelon settlement dollars, etc.) These funds are administered by different entities and their target markets are not uniformly aware of how to access them. Several programs target overlapping constituencies, some of whom do not seem to be aware of the program offerings.
- **Maryland's existing finance efforts lack scale** - Existing Maryland financing programs are generating an average of \$20 million in investment per year. The amount of financing available through these programs alone is insufficient to meet the State's multi-billion dollar energy efficiency and renewable energy financing needs.
- **Financing gaps exist within various markets in Maryland** - Stakeholders identified specific financing gaps in the following areas: small commercial / small business projects between \$5,000 and \$2 million; small municipal projects between \$50,000 and \$1 million; low- to moderate-income residential; and emerging technologies across all sectors and project sizes.
- **Maryland stakeholder groups are engaged in the green bank formation process** - Key Maryland stakeholders, including financial institutions, contractors, utilities, municipalities, consumer advocacy groups, and business leaders believe that the state could benefit from an entity that could house many of the existing initiatives, promote them, and identify and fill the gaps in funding and technical assistance.
- **Green banks in other states are successfully leveraging private-sector capital** - Green banks in Connecticut, Hawaii, New York, and other states are successfully leveraging the private-sector to overcome market barriers and increase the amount of private capital available to finance clean energy projects. These organizations serve as models for how a green bank can be developed successfully in Maryland.
- **Existing green banks provide a model for how Maryland might organize, capitalize, and structure a green bank** – Three of the four existing green banks have been capitalized with a combination of a system benefit charge and/or Regional Greenhouse Gas Initiative proceeds, but other funding sources are also possible. Existing green banks are state agencies or quasi-public agencies like MCEC. The MCEC-enabling statute could allow for the sort of broad financing capability required of a green bank. Maryland should pursue further study of this matter.

Next Steps

Having concluded that there is a need, MCEC and Cadmus recommend proceeding with the next phase of this study with research in the following areas per SB 985:

- **The scope and capabilities of a proposed green bank or clean energy bank in Maryland**
 - Policy and legal framework required to enable a green bank
 - Goals and performance metrics for a green bank
 - Approach to private-sector engagement
 - Potential program approaches for target markets
- **The possible sources of capital for a green bank or clean energy bank financing initiative**
 - Sources of funding for the green bank (both initial capitalization and ongoing funding)
 - Method of capitalization
 - Amount required
 - Opportunities for leveraging private-sector capital
- **The best method for establishment**
 - Structure
 - Whether to house a green bank in an existing entity or create a new one



For more information, please visit mdcleanenergy.org
or call 443-949-8505

